DREAM-KITCHEN PLANNER ALL THE HELP YOU NEED Page 56

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THE WORLD'S LEADING WOODWORKING MAGAZINE

JANUARY 1997 ISSUE NO. 94

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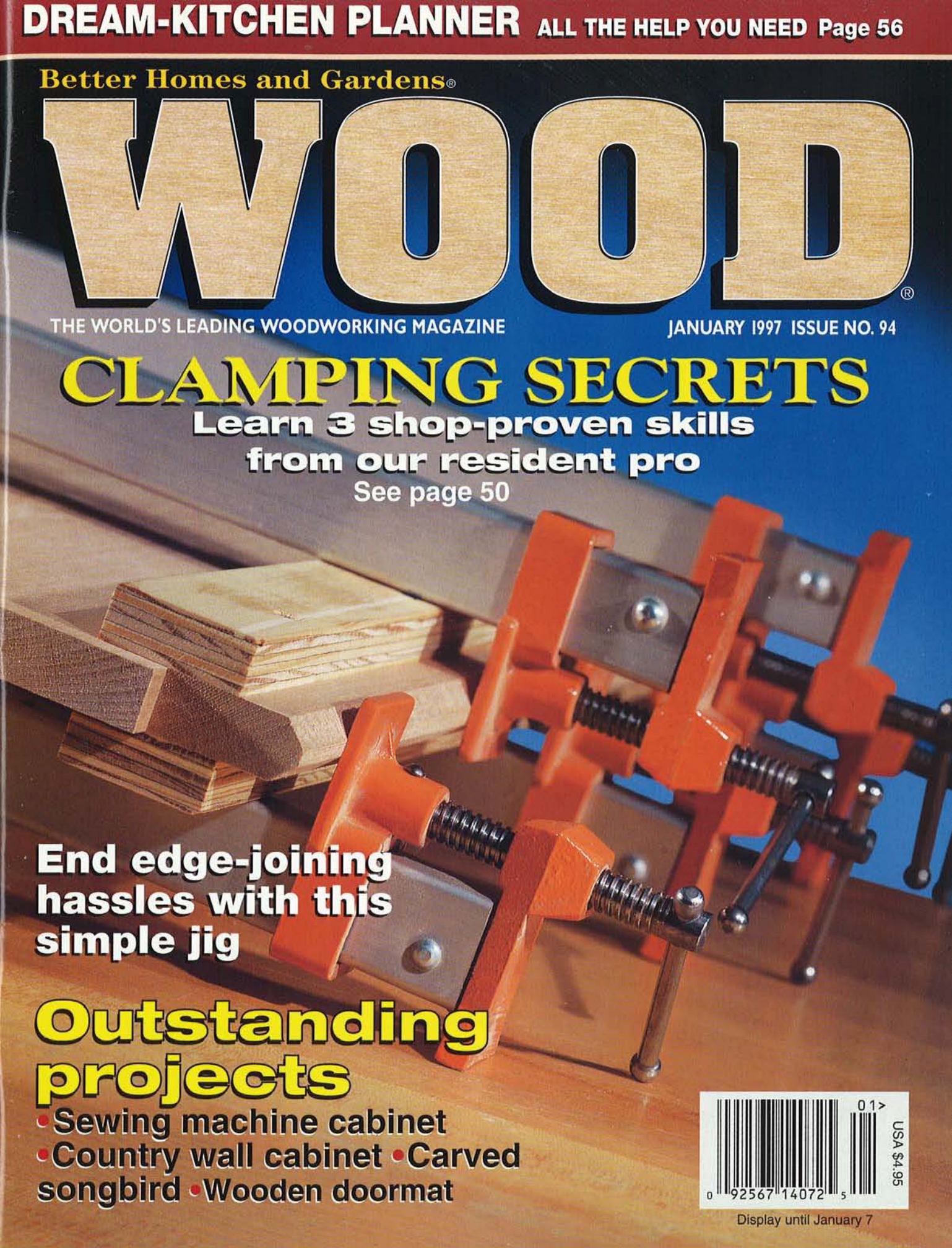
See page 50



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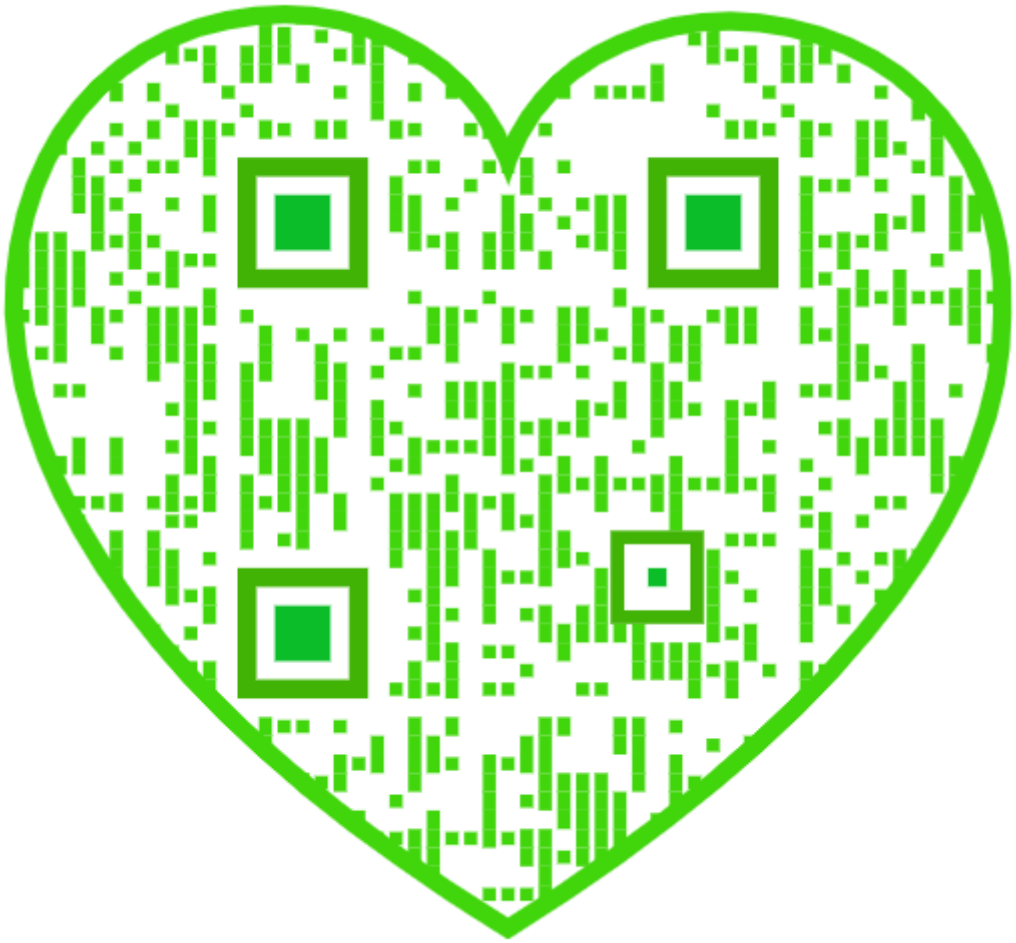

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Contributing Editors KIM DOWNING, DAVE HENDERSON, LORNA JOHNSON, ROXANNE LeMOINE, BOB McFARLIN

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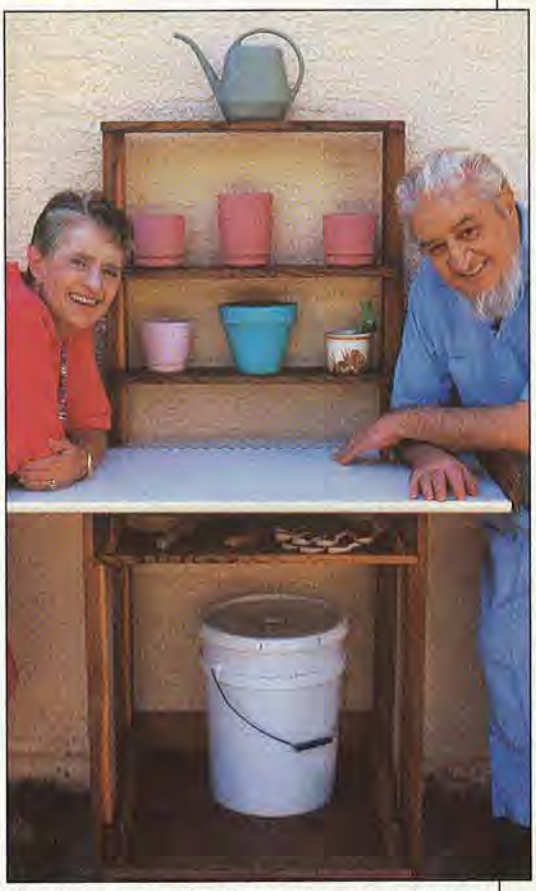
THE EDITOR'S ANGLE

If at first you don't succeed...



The happy couple, Sue and Leroy Wagner, showing off Sue's redwood potting table. Leroy, you've got all the right moves, guy!

As you might well imagine, we can publish only a small fraction of the woodworking projects that come our way each year. By the time we attend numerous crafts shows looking for projects we think you might like, design some projects ourselves in-house, and sort through the many quality submissions from our readers, the selection process becomes difficult to say the least.

So what do we do with those reader ideas we can't use right away? We keep some on file for later use, and for others we write a "thanks, but we're sorry we can't use it" letter to the submitter.

Sometimes, though, the recipient of one of these letters writes back and pleads his/her project-design case. That's exactly what Leroy Wagner, of Glendale, Arizona, did, and his efforts paid off. We're now in the process of building a prototype of his potting-table project, and hope to have it ready for you to enjoy in one of our spring issues.

In his first letter to us, Leroy said, "My wife has a VERY BIG green thumb. And several times a month I notice that I have a problem—I find a big mess on my workbench. First, I considered buying a big lock for my shop, but then I remembered who it was who helps me rip long boards. That's when the potting-table idea hit me." Leroy concluded by saying that the project turned out great, she loves it, and best of all she loves him.

Then disaster struck! We told Leroy that we weren't going to be able to use the design. Undaunted, this longtime reader of *WOOD*® magazine sent us a second letter. In it Leroy said, "I believe this is EXACTLY the type of article you should be looking for. It is easy to build, inexpensive, requires no special tools, and is a product that will fill a need for many of your readers." We give, Leroy! We'll do it, hopefully yet this spring!

So what's the moral of this story? It's that we're not always going to be able to publish every worthwhile design submission we receive. But that doesn't mean you can't coax us a little to publish yours. Sometimes it works; just ask Leroy.

Larry Clayton

Print this article

ISSUE NO. 94 JANUARY 1997

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THE WORLD'S LEADING WOODWORKING MAGAZINE

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This issue's cover wood grain: cottonwood

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Publisher WILLIAM R. REED
Advertising Director **MARK HAGEN**

Display Advertising: 333 N. Michigan Ave., Suite 1401, Chicago, IL 60601 Phone: 312/853-2890 FAX: 312/580-0113
Eastern Advertising Manager **JAMES N. FORD**
Western Advertising Manager **WILL MURPHY**
Administrative Assistant **JENNIFER HAMMEL**

Direct Response Advertising: 1912 Grand Ave., Des Moines, IA 50309-3379 Phone: 515/284-3785 FAX: 515/284-3343
Direct Response Advertising Manager **LISA WIEMKEN**
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Classified Advertising: Phone: 800/424-3090 FAX: 312/464-0512

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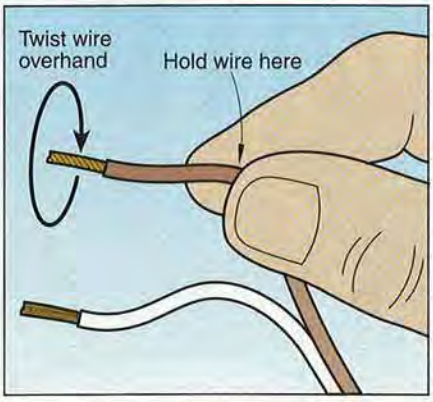
TALKING BACK

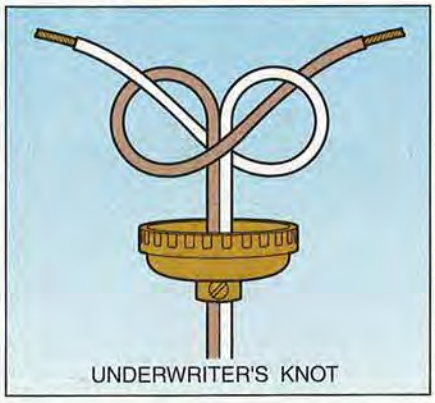
Why not?

I have a couple of additional tips for the article "What Woodworkers Need to Know: Worry-Free Wiring" in the June 1996 issue. First, I've found that when twisting the wire after removing the insulation, it's best to hold the wire in your right hand, and twist the wire overhand with your left (see drawing *below*). This will cause the wire to pull under the screw when it's tightened, rather than mash out.

Second, use an underwriter's knot on the power cord to secure it inside the socket, rather than the knot shown in the middle photo on page 16 of the article. For how to tie this knot, see the drawing *below*.

—Gary Hagins, Service Manager, Hagins Appliance Service Center, Savannah, Ga.



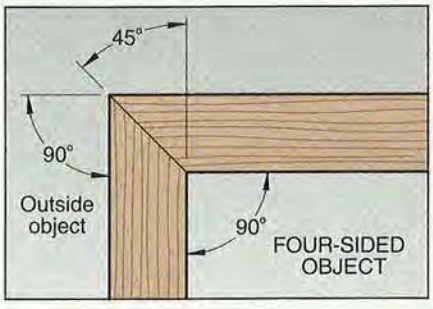


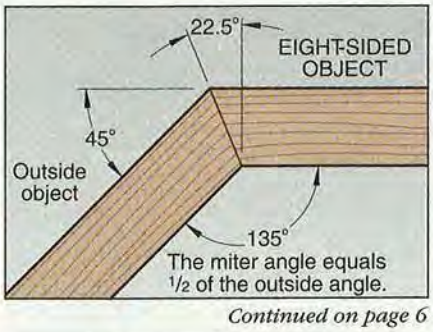
Where did that angle come from?

Maybe I missed something in the Talking Back letter "How to calculate the side length of a polygon" in the January 1996 issue. I was taught that a rectangular object with four sides has a 90° angle on each corner. Can you help a novice woodworker by explaining where the 45° angle for a four-sided object comes from?

—James A. Musil, Willow Springs, Ill.

We sure can, Jim. You're right when you say that the angle of a corner of a four-sided rectangular object will be 90°. However, to assemble a box or case so that the grain appears to flow around the corners, we need to miter-cut the ends of the sides at an angle. And the angle that will give us the best-looking mitered joint equals ½ of the total outside angle of the corner (see drawing below*), or 45° in the case of a rectangle.*





Continued on page 6

How to reach us

We welcome comments, criticisms, suggestions, and even compliments. And you're sure to hear back from us, perhaps on this page! You can "talk back" by one of several ways:

- ***Via mail.*** Send your letter to Talking Back, *WOOD®* magazine, 1912 Grand Ave., Des Moines, IA 50309-3379.
- ***Via computer.*** Send your e-mail to one of these addresses:
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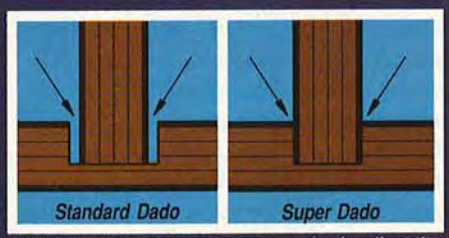

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Continued from page 4

Adjustments to a table hinge

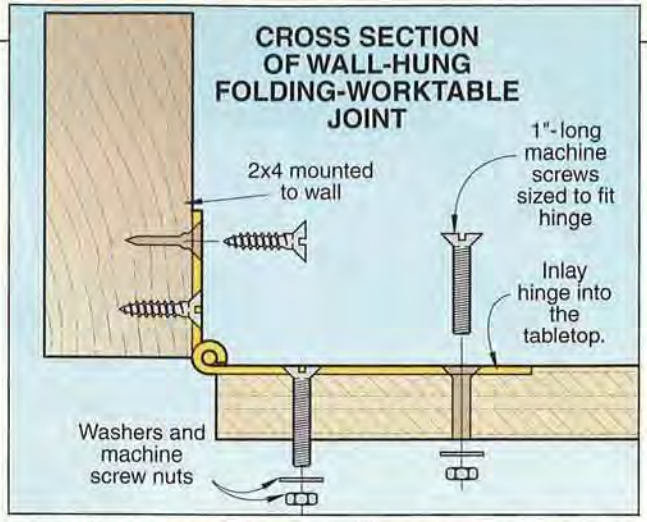
As I was looking over the plans for making the folding worktable shown in the June 1995 "Tips from your shop (and ours)," I came up with the following questions:

1 How do you remove the crossbar when the top folds down? The hinged joint at the tabletop-to-wall mount shown in the drawing appears to prevent the top from being raised to remove the crossbar.

2 What do you do with the crossbar after it has been removed? In my shop it would probably wander off and get lost. How about drilling a hole in the crossbar so it could be mounted on the wall alongside the table?

—Carl Puleo, Melrose, Mass.

Good points, Carl! Our solution for the hinge problem is to use some heavy-duty hinges fastened to the wall-mounted 2×4 and the top rear edge of the worktable. Mount these so the hinge-pin area extends below the 2×4 and behind the tabletop.



Inlay the hinges into the tabletop to prevent marring your work on them. Use flathead machine screws, washers, and nuts to firmly secure the hinges to the tabletop (see drawing above).

Your suggestion about drilling a hole in one end of the crossbar and hanging it on the wall makes good sense. We'd drill a ⅜" hole near one end, and mount the crossbar on a 16d nail driven into a wall stud near the worktable.

When can I buy Delta's new planer?

This letter is in response to your article on portable planers in the November 1996 issue. Being in the market for one of these planers, I enjoyed the information you gave on the different types that are available in the marketplace.

The Delta 22-560 seemed to be a good unit, but when I called several Delta distributors, none of them knew of the model 22-560.

What is going on?

—Relmon Cartee, Douglasville, Ga.

Thanks for writing, Relmon. Several other readers have written to us expressing similar frustration. Here's what happened.

We knew that the Delta 22-560 might not be available when the article came out, but we included our test results of an early production model because of its good performance. We felt that leaving it out would deny our readers valuable information that might affect their buying decision.

Also, after the conclusion of our tests, Delta made some slight modifications to the 22-560 that delayed its introduction. Company officials now tell us that they expect the planer to be in stores sometime in January.

In hindsight, we wish we had noted in the article that the machine might not be available immediately. We apologize for any inconvenience.

Hegner scrollsaw update

In our scrollsaw review that appeared in the October 1996 issue of *WOOD®* magazine, we omitted information about Hegner scrollsaws that may prove important to a potential buyer. To begin with, the Multimax 14E has a 1.9-amp. induction motor. The Multimax 18V and 22V models feature front and rear blade tensioning, a thickness capacity of 2⅝", and dual stroke settings of ⅜" and ¾". In addition, all three models that appeared in the article accept both pin-end and plain-end blades. Finally, the stands for all reviewed Hegner models were redesigned this year to provide smoother, quieter operation, according to the manufacturer.

Lots of wood stabilizers out there

In the Talking Back column of our August 1996 issue, we requested help from readers in locating companies that offer wood stabilization using acrylic resins. Here are the addresses of the companies readers wrote and told us about.

Wild Woods
P.O. Box 104
Monclova, OH 43542
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What woodworkers need to know

Harvesting the best grain

When it comes to displaying your finest craftsmanship under a clear finish, the wood's grain can make or break a project's appearance. Here's how our resident expert Chuck Hedlund selects grain to complement his workmanship.

Do you consider the grain of the wood when you're cutting out parts for a project? A lot of woodworkers don't, and all too often it really shows.

Take a look at the buffet *below* for example. Haphazard grain patterns on the drawer fronts chop up the face. The poorly matched fronts grab attention, overpowering the fine workmanship and the beauty of the design.

With another set of drawer fronts the buffet looks completely different, *page 10 top*. Now, grain lines run straight across, parallel to each other. These uncluttered fronts emphasize the buffet's horizontal lines.

A hodgepodge of grain on the drawer fronts breaks up the face of this buffet. Straight grain on the drawers (*page 10 top*) creates a smoother look.

Plan for appearance

The second buffet didn't end up looking beautiful by accident. Chuck Hedlund, *WOOD*® magazine's project builder, selected the grain to give it that look. Here's how he reaps the best grain when building a project.

Before Chuck cuts any wood for a project, he takes a close look at the plans. "The first thing I do," he says,"is consider which parts will be most prominent—where the wood will show the most." (The day we looked in, he was starting to build a wall-hung shelf. Its two endpieces would be most visible, he decided.)

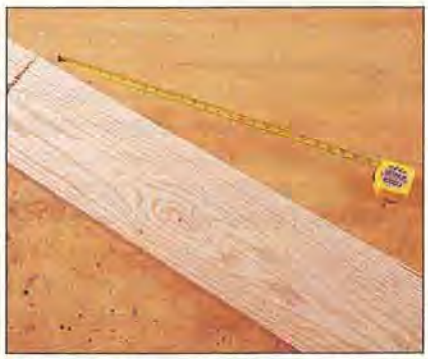
At the same time, he considers how much grain display is appropriate. "Don't get carried away with grain," Chuck warns. Wildly figured stock may look spectacular by itself. But when made into furniture with complex moldings and other details, the overall effect can be confusing and distracting. As a general rule, ornate designs look best built from plainer wood. Save the highly figured boards for accents or simpler pieces. "Don't make the grain fight the design," Chuck says.

Lay out the parts

Chuck divides the stock into sections roughly sized to accommodate the parts, starting with the largest, most prominent ones. "I disregard the order of the parts on the Bill of Materials," he says, "and completely ignore cutting diagrams." He cuts nothing until he's laid out the major, visible parts. To do that, Chuck grabs a tape measure.

Thinking about the two ends of the shelf, for instance, he studies a 10'-long oak board. "This might look good centered on an end," he says, pointing to an elliptical grain pattern.

Then, Chuck locates the figure's visual focus. Centering on that, he measures and marks a section a little longer than the part, shown *below*. He also marks out a similar section for the other end, and identifies both with the letter for the part.



The red dot marks the visual middle of a grain figure. Measure from the spot to center the grain on the project part.

"If you have trouble visualizing how the grain will look, cut a window the size and shape of the part in a piece of light cardboard," Chuck suggests. "This works great for determining grain orientation. Often, if you just cut

Continued on page 10

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Harvesting grain

Continued on page 8

a part straight out of a board, the grain makes the part look warped—it's an optical illusion. The window can help you spot that before you cut the wood. Then, by turning the window slightly or moving it a little one way or another, you can perhaps avoid the problem." (See photos *center right.*) This trick also helps you lay out parts that need to match or be opposites.

As he lays out parts, Chuck watches for knots and flaws he'll need to avoid. Usually, he can move a piece slightly to avoid a bad spot, especially as he gets down to the smaller ones.

When gluing up stock for wider parts, Chuck selects the mating pieces and rips their edges with an eye toward maintaining grain harmony. Gluing up pieces with mismatching grain at the joint unnecessarily breaks up a surface, shown *below right.*

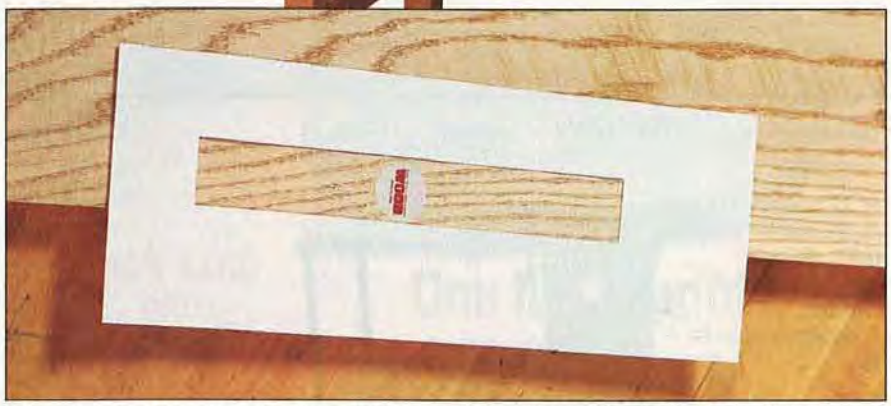
Finishing makes a difference, too. "On wood with a strong grain, such as ash or oak, avoid dark stain or other finishing treatments that accentuate the grain," Chuck advises.

What's it going to cost?

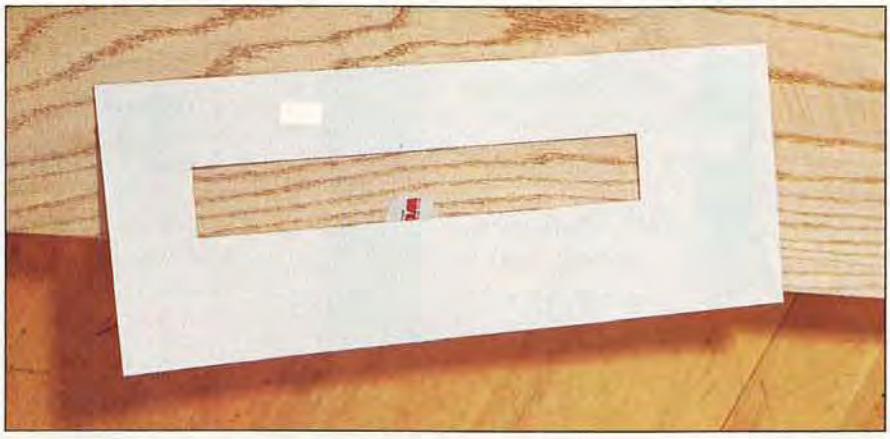
Laying out parts to provide optimum grain appearance may create some waste and require more wood. But you can still cut out hidden or interior parts with little or no regard for appearance, so the penalty may not be unreasonable in many cases.

Considering that you might buy several hundred dollars' worth of lumber and invest 40 or 50 or more hours in building a piece of furniture worth perhaps a thousand dollars, the cost of enough extra lumber to do a first-class job seems a small price to pay.

Carefully selected grain enhances this buffet's beauty. Subtle grain doesn't overpower the graceful design.



The grain would appear to run off the edge of a door stile ripped from the edge of this board *above.* Rotating the part slightly, shown by the window *below,* would result in straighter grain.



Poorly matched grain accentuates the joint *above.* Simply flipping one piece around results in a better match *right.*

Photographs: John Hetherington Written by Larry Johnston

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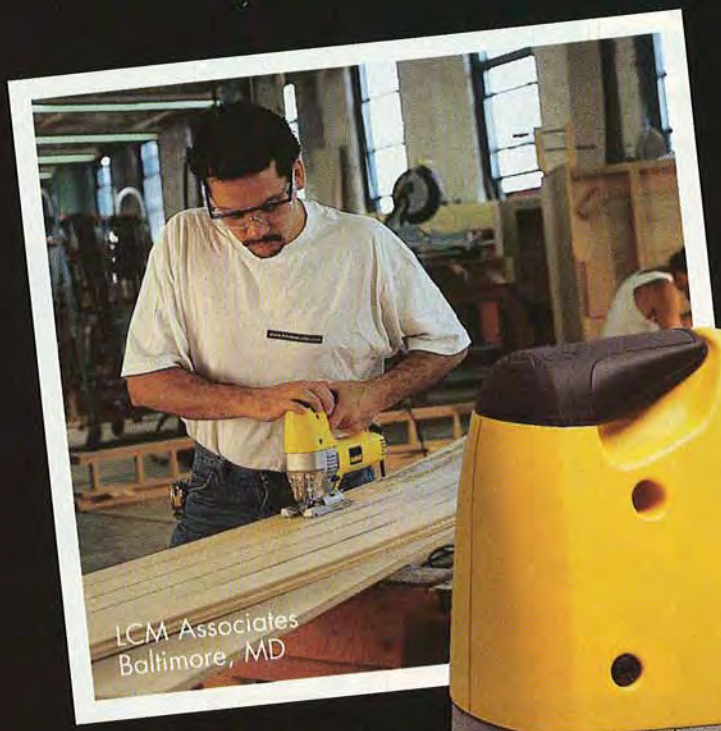

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Meet Top Shop Tip winner and *WOOD*® magazine reader Gary Webster.

Beginning this issue, you'll be seeing a new face here as we recognize the winner of our Top Shop Tip contest. It's a way to meet a fellow woodworker and *WOOD* magazine reader.

Gary Webster of Indianola, Iowa, has built a number of *WOOD* projects since he started woodworking 16 years ago. The oak wagons he's proudly displaying are part of a production run of 12 that he plans to sell at a local crafts fair.

Congratulations to Gary for submitting the top tip. His winning idea proves that a tip doesn't have to be complicated to be clever and useful.

Your solution to a particular woodworking problem may be worth $40. If it's selected as the Top Shop Tip, you'll win a tool prize valued at $250 or more and be featured in this column. To submit a tip, send a letter, including your daytime phone number, with a photo or drawing of your idea, to:

Tips from Your Shop
(And Ours)
***WOOD* Magazine**
1912 Grand Ave.
Des Moines, IA 50309-3379

We try to publish original shop tips, so please send your idea only to *WOOD* magazine. Also note that we cannot return submissions. Thanks!

Kerry Gibson

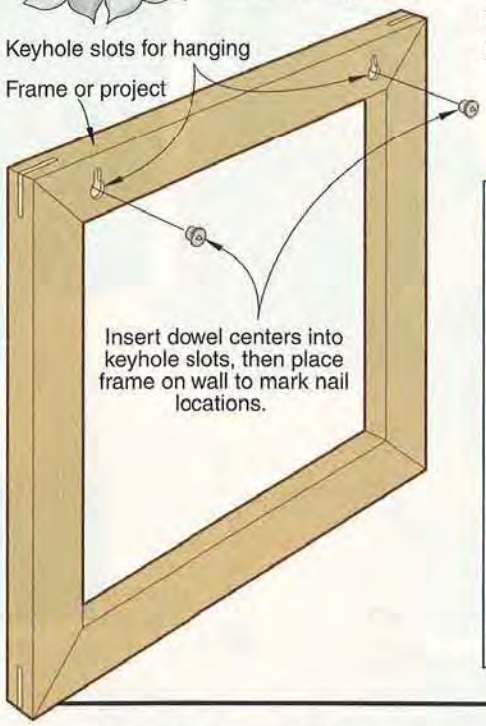
GENERAL-INTEREST EDITOR

Dowel centers hold the key to keyhole hangers

I always had trouble hanging projects with keyhole slots. Even with an assistant, it was hard to get the nails in the wall to line up with the slots. Then I found a simple solution that precisely marks the location of the hanging fasteners.

When I hang a project, I insert ⅜" dowel centers into the keyhole slots cut into the back of the frame as shown *at left.* I position the project on the wall, then simply press it tightly against the wall to mark the exact location for the hanging nails.

—Gary O. Webster, Indianola, Iowa


Keyhole slots for hanging
Frame or project
Insert dowel centers into keyhole slots, then place frame on wall to mark nail locations.

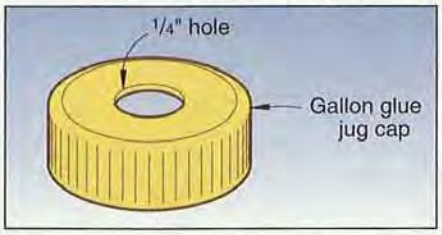
For submitting the Top Shop Tip for this issue, Gary Webster receives $250 worth of Bessey products from American Clamping Corporation.

Smaller hole makes glue refills spill-free

Every time I tried to refill my small glue bottle from a gallon jug, I wound up spilling glue. The glue ran so slowly that I'd impatiently give the big bottle a squeeze to speed things up. The resulting surge would overflow the opening in the smaller bottle.

I solved this problem by drilling a ¼" hole in the cap of the gallon jug. This allows squeezing a smaller, more controlled stream into the smaller bottle. To reseal the larger bottle, I place a piece of plastic wrap over the top before screwing on the cap. When my current jug is empty, I'll save the pouring cap to use on the next jug of glue.

—Linda S. Lee, Lake Orion, Mich.



Continued on page 14

Print this article

THE NEW DEWALT DW621 2HP HEAVY DUTY ROUTER

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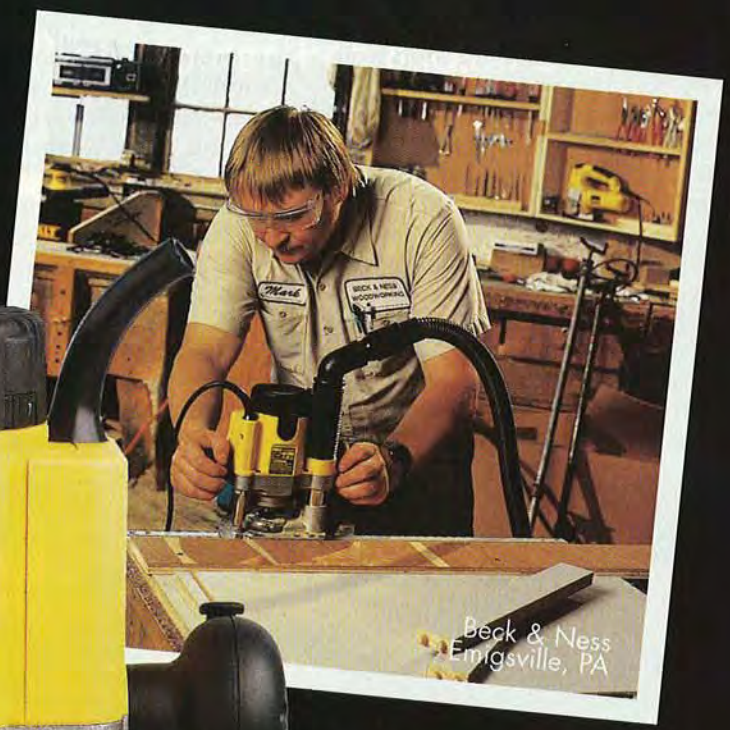

Built-in dust collection system allows dust extraction through the router's plunge column.

When it comes to routers, we'd like to clear the air. Introducing DEWalt's new electronic variable speed 2 HP plunge router which features the industry's only integral dust collection system. Now dust can be pulled through the router's plunge column and efficiently removed by a standard shop vacuum. It also offers the broadest range of speeds in the industry, 8,000 to 24,000 RPM. Plus, this router features accurate, easy to use rack and pinion height adjustment and newly designed round handles with a plunge lock on one side and an on-off trigger on the other for optimum user control. All in all, it's the perfect tool for those who fill their woodshops with talent, sweat and a lot of sawdust. For the distributor nearest you, call 1-800-4-DEWALT.

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Continued from page 12

Fold-down benchtop solves space problem

In my small shop there wasn't enough space for a large, sturdy workbench where I could spread out my tools and work on big projects. So I came up with a bench that offers lots of work surface, yet folds flat against my shop wall.

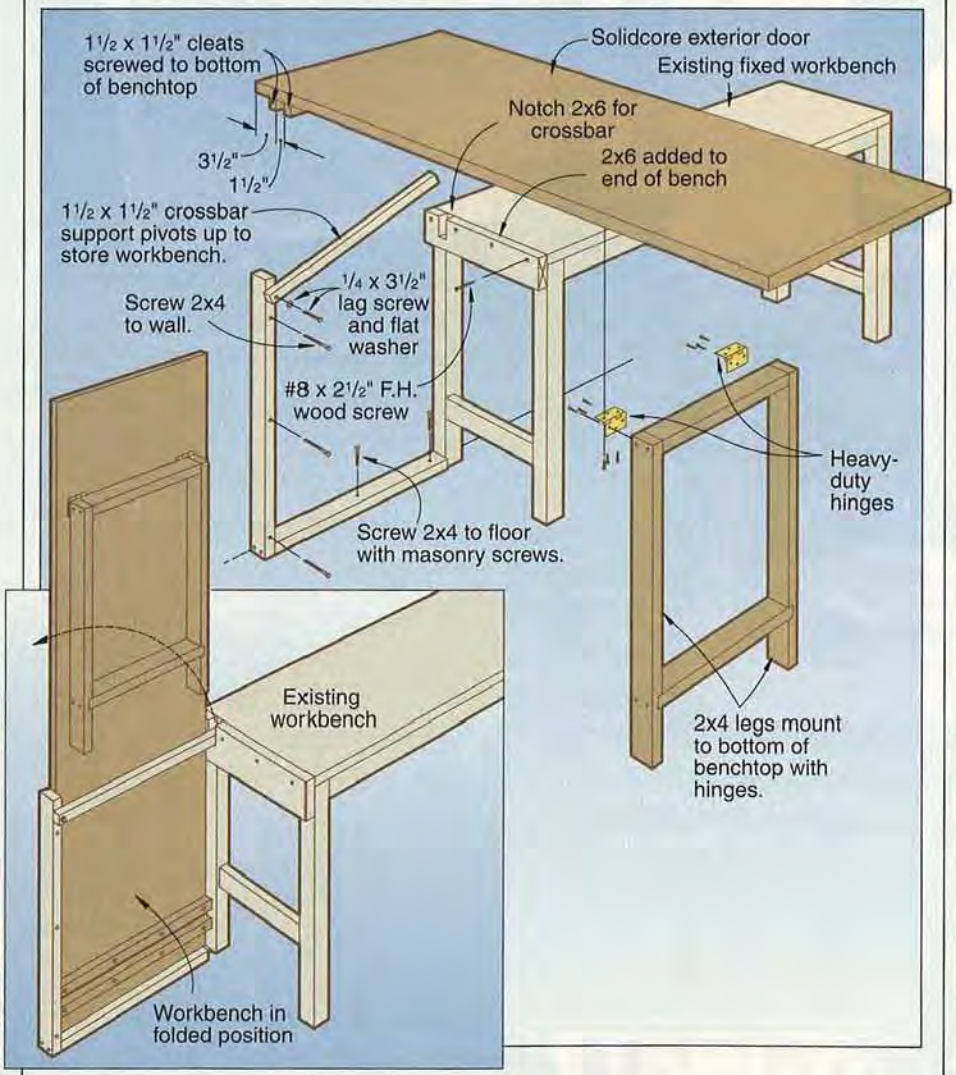
The benchtop consists of a solidcore exterior door. You can find these in home centers and lumber stores in widths up to 36" and lengths of 80–96".

To convert the door to a bench, first build a wall frame and attach it to the wall and floor as shown *below*. Make sure the screws that attach the frame to the wall penetrate at least 1½" into a wall stud or other solid support. Size the inside dimension of the frame to match the width of the door plus ⅛" for clearance.

Next, build the swinging legs to a length that puts the benchtop at a comfortable working height. Attach these to the underside of the bench with hinges. Finally, attach the cleats to the bench, screw the notched 2×6 to the existing bench, and install the crossbar as shown.

To set up the bench, raise the crossbar and lower the end of the bench with the legs. When the legs touch the floor, return the crossbar to its original position, and lift the lower end of the bench onto the crossbar. You've just doubled your bench space!

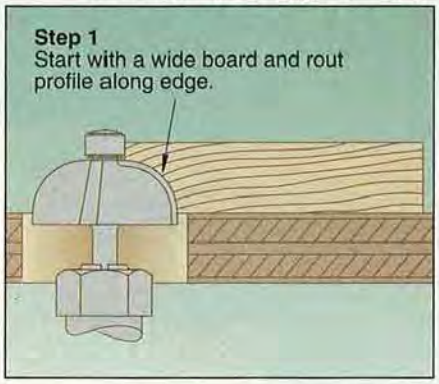
—Mark Curry, Rancho Murieta, Calif.

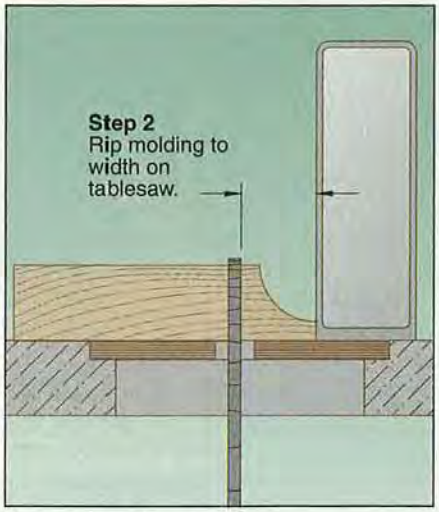

1½ x 1½" cleats screwed to bottom of benchtop
3½"
1½"
1½ x 1½" crossbar support pivots up to store workbench.
Screw 2x4 to wall.
¼ x 3½" lag screw and flat washer
#8 x 2½" F.H. wood screw
Screw 2x4 to floor with masonry screws.
Solidcore exterior door
Existing fixed workbench
Notch 2x6 for crossbar
2x6 added to end of bench
Heavy-duty hinges
2x4 legs mount to bottom of benchtop with hinges.
Existing workbench
Workbench in folded position

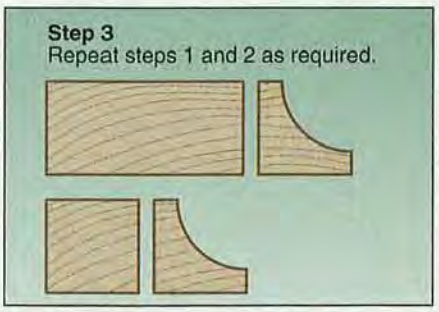
Try this tip to safely rout narrow moldings

Routing narrow moldings can be a tricky, and sometimes dangerous, undertaking. I've found a safer way to cut moldings that's quick and simple. Starting with a wide board, I rout the desired profile along one edge. Then I rip the molding piece to width on my tablesaw. I rout and rip subsequent pieces from the same board until it becomes too narrow to handle safely.

—From the* WOOD *magazine shop







Continued on page 16

THE NEW DEWALT DW682 HEAVY DUTY PLATE JOINER

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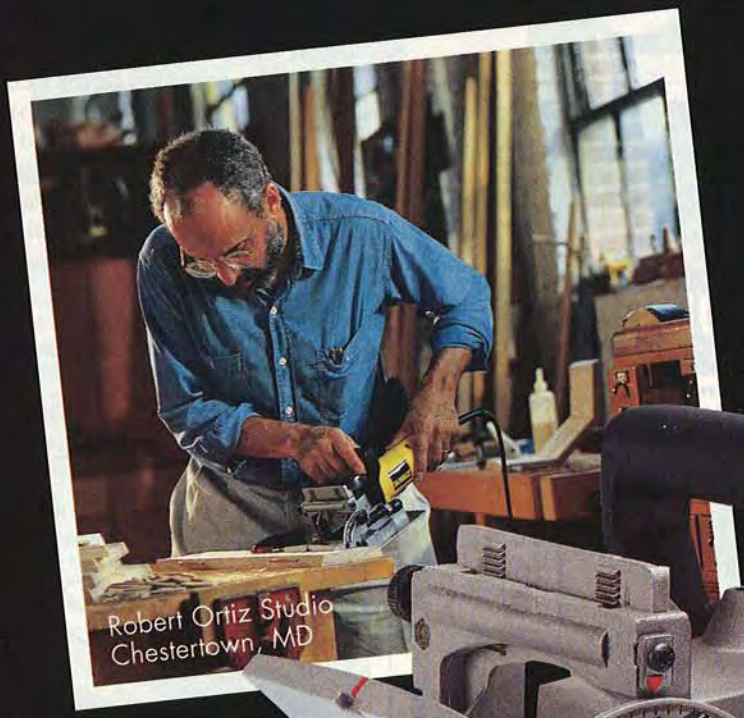

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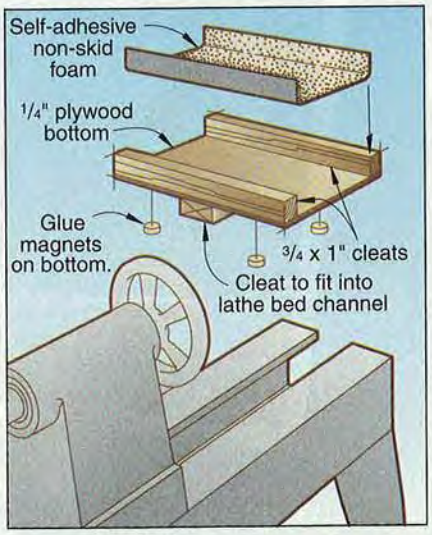
TIPS FROM YOUR SHOP (AND OURS)

Continued from page 14

Safe lathe tool storage

To keep my lathe chisels safe from edge-dulling bumps against the ways and other metal parts of my lathe, I built this padded tray. I cut the cleat on the bottom to fit into the lathe bed channel, then attached magnets to help hold the tray in place. I lined the tray with thin, nonskid foam, commonly used as shelf-liner material in recreational vehicles. Double-faced tape holds the foam in place. The tray also helps keep my lathe tools from being buried under an avalanche of wood chips that fall beneath the turning.

—Robert H. Fuhrman, Sterling Heights, Mich.



A FEW MORE TIPS FROM OUR WOODWORKING PROS

- To form consistent, perfectly shaped hinge mortises on your projects, follow the process we used on the sewing machine cabinet, *page 74.*
- Peter Chapman shares his secrets for creating bandsawn, three-dimensional animal puzzles, *page 33.*
- Wondering how to form wide bevels or chamfers? Check out the method we used to chamfer the sides of our doormat on *page 44.*

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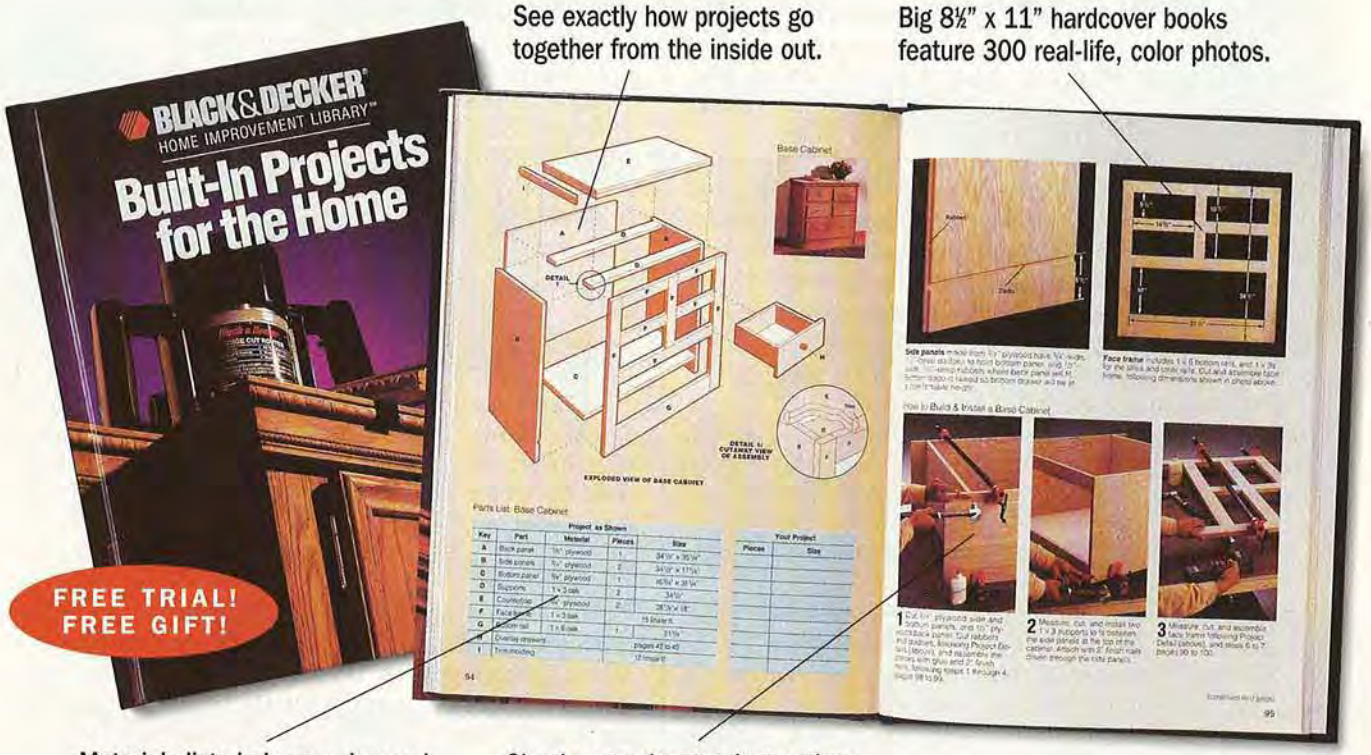
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Cleaner cutting with router

I have been trying to do pattern cutting on ¾" red oak blanks, using a table-mounted router and a 1" flush trim bit. A hardboard pattern fastened to the oak with double-faced tape works as the router guide, and the blank has been cut to within 1/16" to ⅛" of the pattern line. While routing, I feed the wood into the rotation of the bit.

A problem occurs when I start to trim the end grain, and most particularly when cutting into a concave area. When making this cut, the flush trim bit occasionally catches in the end grain. This results in a lot of kickback, enough so that I have wrecked two bits because of bent shafts.

And a second problem occurs when I try to cut the edge grain with this bit. There have been instances in which pieces of wood up to 2" long and ⅛" deep have splintered off. How can I correct these problems?

—Darrell Beauchamp, Wales, Wis.

Use a spiral-fluted router bit for cleaner template routing.

We have some suggestions that should help, Darrell. First, we'd recommend that you use a bit with a ½" shank for this template-pattern work on ¾" oak. The thicker shaft makes the bit more stable and lessens the chance of the bit catching in the grain and kicking back.

Then, use a spiral-fluted bit rather than a straight cutter. The spiral flutes produce more of a shearing action while cutting, reducing the chance for a tearout or chipping of the grain. You can order these spiral-fluted flush trim bits from:

CMT Tools
310 Mears Boulevard
Oldsmar, FL 34677
800/531-5559

CMT USA, Inc.
P.O. Box 4185
Greensboro, NC
27404-4185
910/854-0201

Woodhaven
5323 W. Kimberly Rd.
Davenport, IA 52806-7126
800/344-6657

We also recommend that you keep the amount of material to be removed to 1/16" or less. The less wood that's available for the bit to grab, the less the chance for it to kick back.

Have a question for our woodworking experts? Here's how to reach us.

No matter how simple or perplexing a woodworking problem you're faced with, we would love to hear from you. We'll do our level best to solve your mystery, and you might even find your question and our reply on this page. You can reach us by one of several ways:

- ***Mail.*** Send your letter to Ask *WOOD*®, 1912 Grand Ave., Des Moines, IA 50309-3379.
- ***Via Computer.*** Send your e-mail to these addresses:

CompuServe: **74404,3516**
Internet: **74404.3516@compuserve.com**

Too many cedars

I've been looking at cedar for use in building some outdoor furniture. Can you tell me what the difference is between red and white cedars, and between white cedars and the Alaskan yellow cedar?

—Keith Quisenberry, Mars, Pa.

Keith, with the exception of Eastern red cedar (also known as aromatic cedar), these species are all excellent woods for outdoor furniture. And here's more information on these trees native to the United States.

Northern white cedar and Western red cedar fall within the genus *Thuja*. Being the most geographically widespread of the "cedars," lumber from one of these species should be readily available in your area. And because of their decay and insect resistance, you'll find them used in many outdoor projects. The most common applications include shingles, siding, house trim, posts, fences, and many uses in the boatbuilding industry.

Both woods are soft in texture, brittle, and coarse-grained. You'll find they work easily with power and hand tools, and are stable under most conditions. The most noticeable dissimilarity is in color: off-white to a pale yellow-tan for Northern white cedar and a dull red-brown for Western red.

The genus *Chamaecyparis* includes Atlantic white cedar, Port Orford white cedar, and Alaska yellow cedar. These trees produce fine-grained and even-textured woods that rank high in decay resistance. However, because of their more limited growing range, you will find lumber from these trees more difficult to come by outside of their native areas.

Atlantic white cedar produces a light brown heartwood with a pink tinge, while the wood of Port Orford cedar appears light yellow in color. Alaska yellow cedar has a bright yellow heartwood and is heavier and stronger than the white cedars. The woods in this second group find many uses in furniture making, interior finishing, small boat hulls, and cabinet making, as well as siding and shingles.

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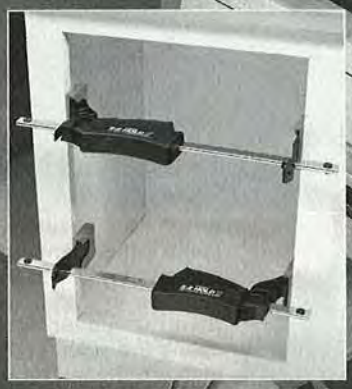

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THE STANLEY 57 CORE-BOX PLANE

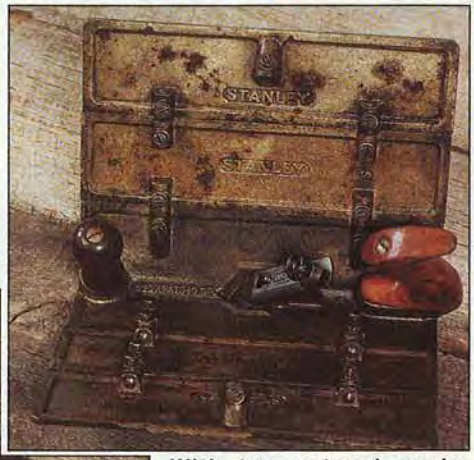
A tool that gets right to the point

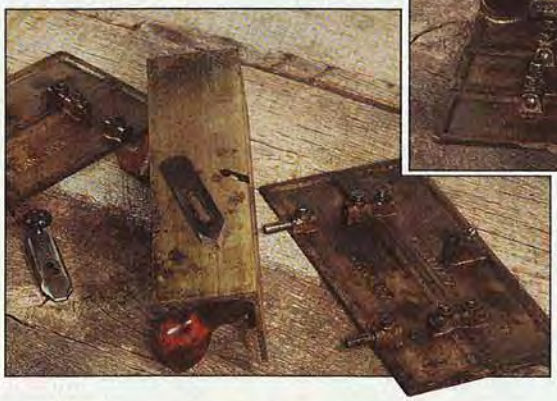
The odd-looking plane *far right* is a woodworking tool you wouldn't find in the average woodworking shop. It came instead from an iron foundry, where it belonged to the craft of patternmaking.

Woodworking in a foundry

Metal casting begins with a pattern—a replica of the item to be cast. The pattern, oversized to allow for shrinkage that occurs as molten metal cools, is used to make a mold. Once, foundry patterns were made largely, if not entirely, of wood. Patternmakers were all-around woodworkers, skilled at joinery, carving, and turning. (Many still are.)

The Stanley 57 core-box plane *far right* served one patternmaking task—hewing a half-round channel for the top or bottom half of a core box. A core box is a form for making a core, a cylindrical element placed in a mold to create a hole in the casting. Cores form the cylinder bores in an engine block, for example.





With two extensions installed, the Stanley 57 core-box plane *(above)* handles work up to 7½" in diameter. A rod (removed for clarity) spans the sides at the top to stabilize them. The iron features a pointed end *(left)*.

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A V makes half an O

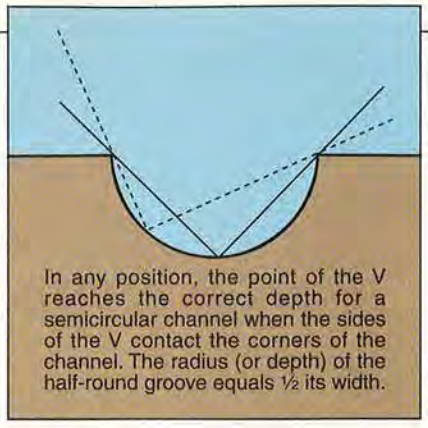
A plane with a round-nosed iron and semicylindrical sole would carve core-box channels of a fixed size easily. But since a foundry mold might call for cores of any diameter, practicality demanded a tool that could hew out channels of different sizes. A plane with a pointed iron and a V-shaped sole provided the solution.

The beauty of the V-shape is that the plane automatically maintains the radius for a half-round groove of any diameter. (The groove's width equals the diameter of the core to be made in the form.) With the plane's wings riding along the edges of the groove, the iron, which extends through the point, always forms a perfect radius, as shown above *right*.

The ⅞"-wide, pointed blade (lying on the bottom of the plane, *opposite page*) doesn't cut away the wood very quickly, however. So, the core-box grooves ordinarily would be roughed out with gouges or other tools first, then completed with the plane.

The basic Stanley 57 with one wing extension installed on each side could handle work 1–5" in diameter. With two extensions in place, as shown *opposite page*, it could go to 7½", and with a full set of three, 10".

The 57's heyday came with American industrial growth, around the turn of the century. (The plane was marketed from 1896 until 1943.) From about 1909 until 1923, Stanley catalogued a smaller core-box plane, too. This one, the 56, covered a range from 9/16–2". A 57 in good condition with a full set of three extensions might bring upwards of $400 from a collector today. A 56 could fetch even more.



In any position, the point of the V reaches the correct depth for a semicircular channel when the sides of the V contact the corners of the channel. The radius (or depth) of the half-round groove equals ½ its width.

And while you might not find a plane like this in what we think of as a woodworking shop today, you will likely find its descendant—the core-box router bit.

Tool from the collection of Philip W. Baker, Venice, Florida.
Photographs: John Hetherington
Written by Larry Johnston

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HOW TO DECIDE WHAT TO SELL

Craftsmanship alone isn't enough

Ray Murray had no intention of becoming a professional woodworker. He had a good nest egg to retire on after leaving a job in security management. But when a friend who owned a furniture rental store asked him to make a bunk bed, he gave it a try. That was the start of a business near Cincinnati that today grosses nearly $500,000 annually.

Murray's experience points to one successful approach any woodworker can take in deciding what to sell: Just ask a retailer. Furniture stores, craft stores, galleries, boutiques, anybody who sells the types of things you make, or might want to make, can be an invaluable source. Shop owners and managers are experts at determining consumer demand because they're face-to-face with customers every day. What's more, they usually know who's already making what—and where you can fill a gap in the market.

Listen and look for product ideas

The idea for Archiblocks, which are sets of wooden blocks in classical architectural styles, sprang from an offhand comment by a museum-store buyer that Vermont woodturner Ron Bower heard thirdhand. Archiblocks became a successful national product for him, with more than $1 million in annual sales.

Most small-store owners will be happy to talk with you, provided you show them the courtesy of scheduling a visit beforehand. And you don't want to distract them from customers when you drop by to talk about your work. They might even invite you to make one of the products that you discuss. These informational visits happen to be great no-pressure sales calls that put you in contact with potential customers without having to close a deal.

Craft shows and fairs are another big potential outlet for your work—and another great tool for discovering what sells. Go to several shows and see what appeals to you. But, more important, watch for what appeals to other consumers. Whose booth is drawing a crowd? What are people actually carrying home versus just looking at admiringly? Even after you start selling your own work at shows, try to take time to walk around and look at other craftsmen's booths. Your research should never end because products and consumer trends are always changing.

Find what you like to make

Retailers and consumers provide only half the answer to the question of what to make. They can show you what consumers want, but they can't tell you what you're good at making. Nor will they invent truly original products for you to make. Even if consumers love wooden pen and pencil sets, if you can't make them at a competitive price, put your own touches on them, and enjoy making them, you won't be successful selling them.

Generally, it's best to start with things you can make easily and cost-effectively with the tools that you already have. It's also important to build things based on your own talents and interests. Such was the case with Tim Detweiler, a Germantown, Ohio, building contractor who loved to toy around in his basement making decorative hardwood padlocks that actually work. After some friends commented on how much they liked them, he turned the eye-catching locks into a big hit on the local craft-show circuit.

Detweiler found out for himself that if a product springs from your innate interests, it's more likely to be novel. And, people are more willing to pay a higher price for it. You'll also enjoy yourself a lot more by expressing your creativity with what you make.

Written by Jack Neff, a Batavia, Ohio, business writer and author of the book *Make Your Woodworking Pay for Itself.*

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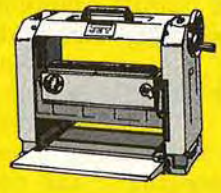

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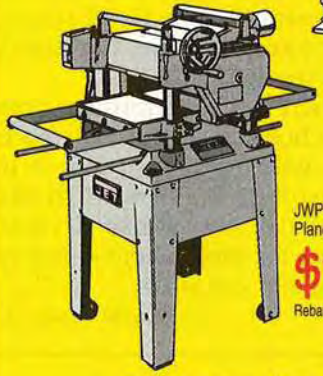

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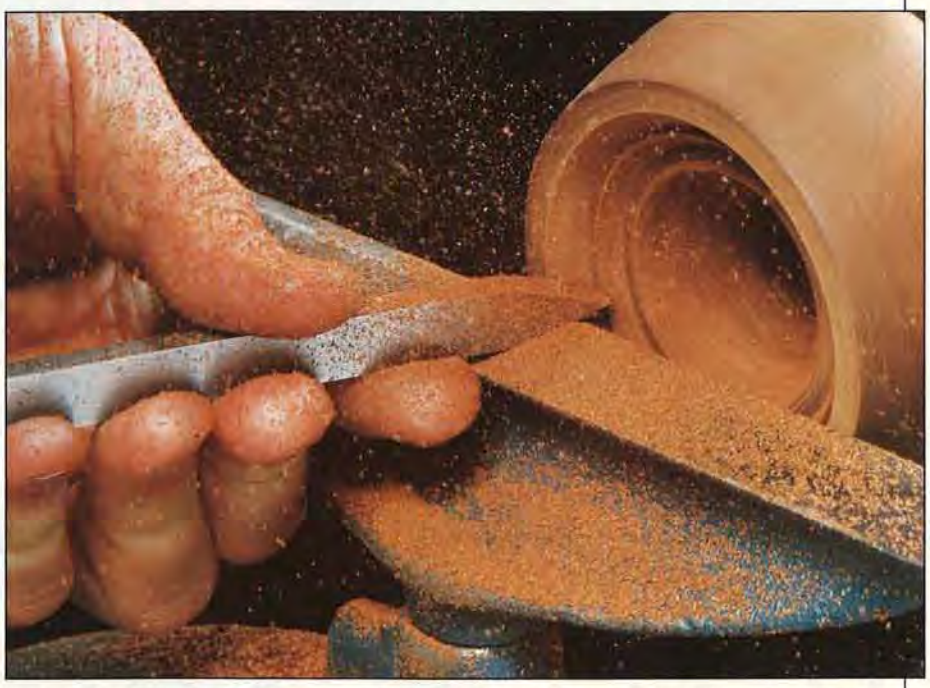
SPOTLIGHT ON LATHE SAFETY

Woodturning appeals to many because with just a few tools you can complete a project in practically no time at all. Yet, sharp gouges, spinning stock, and moving belts can spell trouble for the unprepared.



For safe turning, keep the tool rest about ⅛" from the stock. This prevents the tool from catching and being thrown.

Lathe chucks spin between 400 and 3,000 rpm. That's why you can reduce a chunk of raw wood to a nicely shaped bowl or spindle in record time. Yet, that speed, combined with sharp turning tools, also means that accidents happen in a flash. But, if you heed the following tips compiled from the *WOOD*® magazine shop, industry sources, and the National Safety Council, your woodturning should always be an accident-free experience.

Get ready for turning

As when you're operating most machines in your wood shop, you should always wear safety goggles, safety glasses with side shields, or a face shield when working at a lathe. Add a dust mask when sanding, and hearing protection when turning for extended periods. Don't wear gloves, jewelry, loose clothing, or dangling objects (a tie or long hair) that can catch on rotating stock or machine parts. Also pay attention to the following advice:

- Choose the correct tool for the type of lathe work you'll be doing. For instance, a skew chisel cuts and you use it for spindle turning. For faceplate work, such as a bowl, you might select a round-nose scraper. So become familiar with turning tools before you start.
- Make sure that your stock has no checks, loose knots, or insufficiently glued joints that could come loose and send wood flying from the lathe.
- Task lighting on the lathe should be shadow-free.
- Make certain that the lathe's belt-guard cover is in place and that all locks and clamping devices are tight.
- Adjust the tool rest so that the tool's cutting edge contacts the work at or slightly above the stock's center line and as close as possible to it (about ⅛"). Check clearance between the stock and tool rest by revolving the stock by hand. Never adjust the tool rest while the machine is on and the stock is revolving.
- Imbed centers securely by tapping the stock with a mallet. And tightly clamp the tail stock to avoid slippage.
- Use a ball-bearing (live) tail center whenever possible, or add paraffin to a fixed (dead) tail center so that the stock turns freely.
- When faceplate turning, firmly anchor the stock to the faceplate with screws, or glue it to a wasteblock screwed to the faceplate. Never use drywall screws for attachment—they're brittle and can snap.

Continued on page 26

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LATHE SAFETY

Continued from page 24

Balance the stock for safe operation

If you want your turning to go smoothly, heed these tips:

- Rough-cut square stock for spindle turning to an octagonal shape with hand or power tools before mounting it on the lathe. The closer it is to round, the less likely it is to grab a tool, or make the lathe vibrate due to imbalance. You also must saw your turning blocks to a round shape for faceplate work.
- Perform all roughing work between centers at a slow speed of 400-600 rpm until the stock becomes cylindrical. Large-diameter faceplate work should also be done at slow speed. Remember, the larger the stock you want to turn, the slower the speed. You can increase rpm for finish work.
- Before remounting a turned piece, make pencil marks on the faceplate and the stock so that it exactly lines up with the original mounting. If you don't, the piece will turn off-balance.

Watch your tools

It's easy to get overconfident with a lathe. So keep the following points in mind:

- If not properly handled, a roughing gouge near the stock's end will easily grab and tear out of your hand as well as damage the wood. To avoid this, begin work a few inches inside the end and move out toward it.
- Watch where you lay your tools. A dropped gouge or chisel can injure your foot or be tossed by the lathe.
- To prevent injury, always remove the tool rest before sanding or applying finish to the turned stock.
- Never reach across stock that's turning on the lathe. Your hand or arm may catch on the wood and be pulled into the lathe bed.
- Sweep or vacuum loose shavings and chips from the lathe and floor. Excess waste on the floor can cause you to slip.

Written by Peter J. Stephano
Photographs: Bob Calmer

Out-of-balance stock will make the lathe vibrate excessively, so round-down rough stock for faceplate or between-centers turning before mounting it.

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511	CYLINDRICAL LOCK INSTALLATION KIT	148
550	NEW POCKET CUTTER	186
552	PRODUCTION POCKET CUTTER	569
556	BISC JOINER W/CASE & TILT FENCE	132
556K	SAME AS ABOVE W/1000 BISCUITS	152
690	1 1/2 HP ROUTER	140
691	1 1/2 HP "D" HANDLE ROUTER	158
691K	691 W/CASE, EDGE GD & TEMP GD KIT	209
90690*	SPECIAL EDITION 1 1/2 HP ROUTER W/CASE	158
693	PLUNGE BASE ROUTER, 1 1/2 HP	178
697*	ROUTER TABLE WITH 1 1/2 H P MOTOR	228
698*	ROUTER TABLE ONLY	134
743K	7 1/4" FRAMERS SAW, LEFT SIDED WITH CASE	128
2620	3/8" VSR DRILL, 0-1200 RPM W/CHK	96
2621	3/8" VSR DRILL, 0-1200 RPM, KEYLESS	96
5008	DOVETAIL TEMPLATE	79
5009	MORTISE & TENON JIG	49
5116	OMNI JIG	268
6931	PLUNGE ROUTER BASE	78
7116	NEW 24" OMNIJIG	292
7310	LAMINATE TRIMMER, 5.6 AMP	97
7312	OFFSET LAMINATE TRIMMER	134
7335	5" RANDOM ORBIT SANDER	132
7336	6" RANDOM ORBIT SANDER	136
7335K	5" RANDOM ORB W/CASE, 73333 & PAPER	168
7336K	6" RANDOM ORB W/CASE, 73333 & PAPER	176
7499	CUTOUT TOOL	68
7518	3 1/4 HP FIXED BASE ROUTER-5 SPEED	274
7519	3 1/4 HP FIXED BASE ROUTER-1 SP	248
7536	2 1/2 HP FIXED BASE ROUTER	209
7537	2 1/2 HP FIXED BASE "D" HNDL RTR	224
7538	3 1/4 HP PLUNGE ROUTER-1 SPEED	248
7539	3 1/4 HP PLUNGE ROUTER-5 SPEED	274
7700	10" MITER SAW W/CROWN ATTCH	389
7800	DRYWALL SANDER	326
7810	POWER TOOL TRIGGERED WET/DRY VAC	258
9118	PORTA PLANE KIT W/CASE, CRBD BLD	228
9125	3 1/4" PLANER WITH CASE	138
9341*	1/4 SHEET FINISHING SANDER WITH CASE	58
9444*	PROFILE SANDER KIT WITH ACCESSORIES	108
9647	TIGER CUB RECIP SAW KIT	129
9737	RECIP TIGER SAW, 9.6A, QUICK CHNG CHUCK	162
9830	9.6V CORDLESS KIT W/2 BATTERIES, CASE	148
9653S	12V CRDLS KIT W/2 BAT, CASE	159
9862	12V CORDLESS KIT W/2 BATTERIES, CASE	178
97310	LAMNT TRIMMR KIT W/3 BASES & CS	188
97499	CUTOUT TOOL WITH BITS & CASE	88
97549	JIG SAW W/CASE & 3 BLADES	144

The International Tool Woodworkers Special

Model 906901K Includes 90690 commemorative router with case, 6931 plunge base, 42160 edge guide, 42000 template guide kit, 39993 routing pad, The World of Porter Cable Routers video, and a $5.00 coupon towards future Porter Cable accessory purchase **OUR PRICE $284.00**

Tis the Season for International Tool Holiday Specials!

BOSCH MODEL 1613EVSK 1613EVS router w/ RA1051 edge guide $208.00

DEWALT MODEL DW682K Biscuit joiner kit $199.00

freud MODELJS100 Biscuit joiner with $30 factory rebate $137.00

SKIL MODELHD2745-04 12Vcdls drill kit w/2 batteries & case $128.00

HITACHI

C10FC	10" COMPOUND MITER SAW	209
C10FS	NEW 10" SLIDE COMPOUND MITER SAW	738
M12V	3 HP VAR SPEED PLUNGE ROUTER	208
TR12	3 HP PLUNGE ROUTER	188

SENCO

SKS	NARROW CROWN STAPLER	274
SLP20	BRAD NAILER W/CASE 5/8"-1 5/8" CAP	278
SFN40	FINISH NAILER 1 1/4"-2 1/2" CAP	389

POWERMATIC

ALL PRICES INCLUDE FREIGHT! IN CONTIGUOUS U.S.A.

13	6" X 89" EDGE SANDER	629
14	OSCILLATING SPINDLE SANDER	295
15	15" PLANER	1295
54	6" JOINTER WITH ENCLOSED STAND	545
60	8" LONG BED JOINTER	1695
64	1 1/2 HP TABLE SAW W.BIESMEYER FENCE	745
64L	1 1/2 HP TABLE SAW W/50" BIES. FENCE	845
66	3 HP, 1 PH 10" T.A. SAW W/50" FENCE	1995
66	5 H P, 1 PH 10" T.A. SAW W/50" FENCE	2095
73	1 1 /2 HP DUST COLLECTOR	419

AIRY

0241NK	18 GAUGE BRAD NAILER 3/8"-1 9/16" WITH CASE & 5000 NAILS	96
0250NK	18 GAUGE BRAD NAILER 3/4"-2" W/CASE & 5000 NAILS	162
0350NK	15 & 16 GA. FINISH NAILER 3/4"-2" W/CASE & 5000 ASSORTED BRADS	192
0565T	ANGLE FINISH NAILER 1"-2 1/2"	203
0626NK	NARROW CROWN 1/4" STAPLER 1/2"-1" WITH CASE & 5000 STAPLES	103
0638P	3/4"-1 1/2" NARRW CRWN STPLR W/CS	179
EZ-1	SHOOTS 1/4", 3/8", 1/2" CRN STAPLES & BRADS, 5/8" CAP, W/CASE & 5000 ASSORTED FASTENERS	96

OUR PRICES WILL NOT BE BEAT!

makita

6172DWE	7.2V CDLS DRILL KIT W/2 BATT	99
6095DWE	9.6V CDLS DRILL KIT W/2 BATT	129
DA391DW	9.6V ANGLE DRILL KIT	178
6211DWE	12V KIT W/2 BATTERIES	168
5007NBK	7 1/4" CIRC SAW W/CS & BLADE	125
LS1011	10" COMPOUND MITER	469
LS1211	12" COMPOUND MITER	798
N1900B	3 1/4" PLANER	134
BO5001	5" RANDOM ORBIT SANDER	67

Emglo

$298.00
AM78HC4V 1 1/2 HP COMPRESSOR

DELTA

14-650	HOLLOW CHISEL MORTISER	274
22-540	12" BENCH TOP PLANER	378
23-710	NEW SHARPENING CENTER	169
28-185	BENCH TOP BAND SAW	168
31-460	4" BELT/6" DISC SANDER	132
31-695	6" BELT/9" DISC SANDER	348
34-182	TENONING JIG	82
37-070	*NEW* 6" VS BENCH JOINTER	258
40-540	16" VS SCROLL SAW	176

DEWALT

DW100	3/8" 4 AMP, VAR. SP. DRILL	66
DW321K	TOP HANDLE JIG SAW KIT	162
DW359K	7 1/4" CIRCULAR SAW W/CASE	129
DW411K	1/4 SHEET SANDER WITH CASE	54
DW420	5" RANDOM ORBIT SANDER, PSA	68
DW421	5" DSTLS RNDM ORB SANDER, VELCRO	74
DW422	5" ROS 2 AMP SANDER W/DUST COLLCT	79
DW423	5" VS DUSTLS RANDOM ORBIT SANDER	93
DW430	3" X 21" DUSTLESS BELT SANDER	169
DW431	3" X 21" DSTLS BELT SANDER VAR SP	183
DW441	6" RIGHT ANGLE ROS SANDER, DSTLS	128
DW443	6" ROS SANDER VAR SP, VELCRO	138
DW610	1 1/2 HP ROUTER, 9 AMP	147
DW615	1 1/4 HP PLUNGE ROUTER, VAR SP	163
DW621	2 HP VS DSTLS PLUNGE ROUTER	218
DW625	3 HP HVY DTY PLUNGE RTR, VAR SP	274
DW670	*NEW* LAMINATE TRIMMER WITH GUIDE	97
DW673K	7/8 HP LAMINATE TRIMMER KIT	198
DW675K	PLANER KIT, 7.2 AMP W/STEEL CASE	159
DW682K	BISCUIT JOINER KIT	199
DW705	12" MITER SAW W/CARB BLADE	358
DW936	18V CORDLESS SAW KIT	248
DW972K2	*NEW* 12V CRDLS KIT/W BATTERY & CS	188
DW972KS2	12V CDLS DRILL & CIRC SAW KIT	274
DW991K2	DW991K WITH TWO BATTERIES	224
DW991KS2	14.4V CDLS DRILL & CIRC SAW KIT	348
DW995K	18V 1/2" DRILL W/BATT, CHRGR & CS	238

Panasonic

FREE 12V LANTERN!

EY6100EQKW 12V PREDATOR CORDLESS KIT W/KEYLESS CHUCK, 2 IRONMAN BATTERIES, 15 MIN. CHARGER & CASE, VSR 194

MIRKA Abrasives, Inc.

5" HOOK & LOOP PAPER FOR PORTER CABLE
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80 - 320 GRIT 12.95
5" HOOK & LOOP PAPER FOR BOSCH 3283DVS 50 PER BOX
80 - 320 GRIT 12.95

RYOBI

AP12	12" PORTABLE PLANER	388
DC500K	DETAIL CARVER KIT	62
DS2000K	2 SP DETAIL SANDR W/CS & ACCYS	62
HT20VSK	MULTI ROTARY TOOL W/CS & ACCYS	55
ML618	18" WOOD MINI LATHE	214
OSS450	OSCILLATING SPINDLE SANDER	158
SC162VS	16" VS SCROLL SAW	164
WDS1600	WIDE DRUM SANDER	574

freud

TR215	8 1/2" COMPOUND SAW AFTER REBATE	298
JS100	BISCUIT JOINER AFTER $30 REBATE	137
FT2000E	3 hp PLUNGE ROUTER W/$30 REBATE	174
EB100	EDGE BANDING SYSTEM	214
F410	10" X 40T QUIET BLADE	48
F810	10" X 80T QUIET BLADE	73
LM72M010	10" X 24T FLAT TOP RIP BLADE	34
LU82M010	10"X 60T CROSSCUT/RIP BLADE	46
LU84M010	10" X 50T ATB COMBO BLADE	36
LU85M010	10" X 80 T ATB FOR MIRROR FINISH	50
LU87M010	10" X 24T RIP BLADE THIN KERF	42
LU88M010	10" X 60T CROSSCUT THIN KERF	39
LU89M010	10" X 72T TCH NON FERROUS METAL	57
LU92M010	10" X 80T TCH - BEST FOR LAMINTS	57
LU98M010	10" X 80 T TCH LAMINATES OR WOOD	67
SD308	8" SAFETY DADO WITH CASE	116
SD508	*NEW 8" SUPER DADO SET*	167

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CENTRAL MACHINERY

16" SCROLL SAW

- Precision milled 14-1/2" x 8" table tilts 0° to 45°
- Uses pin end blades, 5-1/2" long
- Heavy duty cast iron frame and base reduces vibration • 7/8" blade stroke
- 5-1/2" blade length
- 1/8 HP, 110V, .83 amps
- 1750 SPM blade speed

ITEM 34618-0SWA **$59.99**

FOOT SWITCH WITH GUARD

Ready to use. Steel housing and 8 ft. cord.

ITEM 00495-6SWA **$9.99**

CENTRAL MACHINERY

10", 2 HP, BENCH TABLE SAW

Die cast aluminum table 25-3/4" x 16", has adjustable 17-7/8" x 2" rip fence and inch/metric scale for precise cutting.

- Maximum depth of cut at 90°: 3-1/8"; at 45°: 2-1/2"
- Blade capacity: 10" with 5/8" arbor
- Miter gauge adjusts 0° - 60° left and right
- Motor: 2 HP, 115V, 60 Hz, 10 amp, 4500 RPM • Blade sold separately, below
- Shipping weight: 36 lbs.

ITEM 35715-2SWA **$79.99**

10" 40 TOOTH CARBIDE TIP SAW BLADE

- 5/8" arbor

ITEM 00529-4SWA **$9.99**

CENTRAL MACHINERY

SAVE $50 FROM OUR SUMMER '96 CATALOG

1996 WOOD MAGAZINE EDITORS' CHOICE TOP VALUE

12" PLANER

Put a professional finish to low cost raw lumber quickly. Powerful smooth drive system gives cool even planing and constant blade speed.

- Motor: 2 HP, 115V, 60 Hz
- Single wheel depth adjustment: 0" to 6"
- Maximum width: 12"
- Maximum planing capacity: 3/32"
- Shipping weight: 66 lbs.

ITEM 06469-7SWA **$299.99**

1/2 OFF

BENCH BRUSH

Perfect for workshop, home, or car. Extra long 2-3/4" bristles trap dust and clear saw dust, wood chips and metal shavings from work bench or tools. 14" beavertail style, natural lacquered hardwood handle with hang-up hole. • 7" brush head

ITEM 01072-4SWA **$1.99**

HITACHI

7-1/4" CIRCULAR SAW

- 115V, 10 amps, 60 Hz, single phase
- 5500 RPM • Tool weight: 8-3/4 lbs.
- Maximum cutting depth: 2-1/4"

Hitachi C7SC

ITEM 35120-3SWA **$79.99**

8-1/2" SLIDE COMPOUND MITER SAW

Hitachi C 8FB

ITEM 31876-8SWA **$429.99**

3/8" 9.6V DRIVER DRILL WITH KEYLESS CHUCK

Hitachi D 10DF2

ITEM 34641-5SWA **$104.99**

4" DISC GRINDER

Hitachi G 10SD1S

ITEM 34644-5SWA **$59.99**

3/8" 9.6V CORDLESS DRILL WITH KEYLESS CHUCK

Hitachi FDS10DVA

ITEM 34998-6SWA **$99.99**

4-1/2" ANGLE GRINDER

Hitachi G12SA

ITEM 35015-1SWA **$59.99**

9.6 VOLT CORDLESS 1/4" IMPACT DRIVER

Hitachi WH8DC2

ITEM 35254-2SWA **$139.99**

SAVE 35% FROM OUR SUMMER '96 CATALOG

12-1/2" ROLLER AND BRACKET SET

Double your table saw capacity! Attach to sawhorse or other surface and make your own roller table. Avoid the high cost of roller stand by making your own. Features: chrome polished roller, steel bracket, two holes for mounting. Roller is 1-1/4" diameter and 12-1/2" long.

ITEM 30026-6SWA **$4.49**

CENTRAL MACHINERY

SAVE OVER 30% FROM OUR FALL '96 CATALOG

6" INDUSTRIAL RABBETING JOINTER

INCLUDES STAND

- Infeed table size: 22-1/2"
- Outfeed table size: 19-1/2"
- Motor: 1 HP, 110V, 4 amp, 4900 to 5900 RPM cutterhead speed
- Maximum depth of cut: 3/8"

ITEM 30289-5SWA **$199.99**

REPLACEMENT BLADE SET

ITEM 33271-2SWA **$15.99**

Pittsburgh LIFETIME WARRANTY

Pittsburgh

SLASHED 57% FROM OUR FALL '96 CATALOG

2 PC. 3/4" HEAVY DUTY PIPE CLAMP SET

Constructed from heat-treated cast iron, these durable clamps keep your work rock steady. Just screw the handle side onto a 3/4" threaded pipe and slide the spring loaded end on. You're ready to go! Pipe not included.

- Handle screw operating range: 2-1/8"
- 1-1/2" throat depth
- Weight: 2-7/16 lbs.

ITEM 31255-4SWA **$2.99**

ODOR-FREE

SAVE 37%

PORTABLE 34,000 BTU FORCED AIR PROPANE HEATER

Circulate clean heated air fast. Heavy duty fan and high BTU output combine for efficient heating in the coldest conditions. Features solenoid valve, pressure regulator, and gas hose fit standard refillable propane tanks, not included. Long lasting stainless steel combustion chamber.

- 13 lbs. shipping weight
- Uses 1-1/2 lbs. of propane per hour
- 15-1/4"L x 7-1/2"W x 9-1/2"H

ITEM 32217-8SWA **$99.99**

RYOBI

Ryobi OSS450

LIMITED QUANTITIES

OSCILLATING SPINDLE SANDER

Nothing beats this machine for contour and curve sanding. 1/2" to 3" drum size range (includes 1/2" and 1" drum) gives you the options. Removes stock fast using the whole drum and prevents sanding burn marks.

- Dust collection port
- Factory reconditioned, factory perfect 120V, 3.5 amps; 45 oscillations per minute; 1680 RPM; 29 lbs. tool weight

ITEM 33625-0SWA **$99.99**

CHICAGO Electric Power Tools

SAVE 20% FROM OUR FALL '96 CATALOG

TRIM ROUTER

Now you can tackle those jobs that were too fine or exacting for a standard router. This compact router weighs only 4 lbs. for easy operation. Includes a straight and adjusting conductor to assist in trimming and engraving in both straight and circular patterns.

- 1/4" collet
- 30,000 RPM no load speed
- 110V, 3-1/4 maximum amp draw
- 8-1/2" overall length
- 4 lbs. tool weight

ITEM 33833-3SWA **$39.99**

DELTA®

Delta 36-510

10" BENCH SAW

Big saw capacity in a portable unit. Easy and safe to use with up-front controls and removable on off switch. Front and rear locking rip fence and miter gauge maintain full sized accuracy.

- Motor: 13 amps, 115V, 4700 RPM
- 5/8" arbor • Table: 16" x 26"
- Capacity: 3" max. depth, 2-1/2" max. depth at 45°
- Dimensions: 15" x 26" x 19"
- 40 lbs. tool weight

ITEM 35734-2SWA **$119.99**

4039

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Circle No. 46

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CHICAGO Electric Power Tools

SAVE 30% FROM OUR FALL '96 CATALOG

8-1/4" COMPOUND MITER SAW

- Powerful 1-3/4 HP motor, 120V, 9 amp, 4900 RPM no load speed
- Cutting capacity 2-1/8" x 5-1/8" miter, bevel, and compound cut
- Miter positive stops at 0°, 15°, 22.5°, 30°, and 45° left and right • 5/8" arbor
- Bevel positive stops at 0° to 45° left
- 20 lbs. shipping weight
- Includes free 8-1/4" multipurpose blade

ITEM 01078-2SWA **$99.99**

8" CIRCULAR SAW BLADE

- 20 tooth carbide-tipped

ITEM 00702-1SWA **$3.99**

SAVE 46%

11 PC. HOLE SAW SET

Cut smooth, clean, accurate holes 7/8" to 2-1/2" through wood, drywall, or even plaster up to 1" thick! Ideal for plumbers and electricians, the set includes 8 tool steel cups sized 3/4", 7/8", 1", 1-1/4", 1-1/2", 1-3/4", 2", and 2-1/2", plus 1/4" and 3/8" mandrels, a 1/4" bit, a hex wrench, and a blow mold case to keep everything organized.

ITEM 01263-1SWA **$7.99**

SAVE UP TO 33%

CONTROLLED PRESSURE, NON-MARRING HARDWOOD CLAMPS

These hand screws will clamp without scratching or marring your workpiece. Hardwood jaws distribute pressure evenly, and can easily be adjusted for non-parallel surfaces and odd shapes.

JAW LENGTH	JAW CAPACITY	ITEM	REGULAR PRICE $5.99 PRICE
8"	4-3/4"	04852-3SWA	$3.99
10"	6"	04853-4SWA	$4.99
12"	8-1/2"	04854-7SWA	$5.99

CENTRAL MACHINERY

1/3 HP

5 SPEED BENCH DRILL PRESS

- 620 to 3100 RPM
- 8-1/4" maximum distance spindle to table • 1/2" chuck
- 2" stroke, 8-1/4" swing
- 1/3 HP motor
- 22-1/2" high, 49 lbs. shipping weight

ITEM 05901-6SWA **$49.99**

DRILL PRESS WITH KEYLESS CHUCK

ITEM 34231-0SWA **$69.99**

CENTRAL MACHINERY

SAVE $20 FROM OUR FALL '96 CATALOG

12" x 37" WOOD TURNING LATHE

Index pin contains 36 - 10° spacings for accurate fluting and marking on workpieces. 4" face plate, center assembly tail stock, spur assembly head stock and 6" and 12" tool rests. (Stand sold separately).
Distance between centers: 37"; Swing over bed: 12"; Spindle speeds: 575, 980, 1560, 2520 and 3580 RPM; Motor: 1/2 HP, 1725 RPM, 115V, 60 Hz AC, swing mounted to headstock; Drive spindle: No. 1 Morse taper plus 3/4-16 threaded; Tailstock: No. 1 Morse taper; 2-3/8" ram travel; Ship. wt.: 80 lbs.

ITEM 06841-0SWA **$139.99**

CENTRAL MACHINERY

FREE ACCESSORIES: Stand, 6" belt, 9" disc, open-end wrench, and hex key wrench

SAVE $30 FROM OUR FALL '96 CATALOG

COMBINATION 6" BELT AND 9" DISC SANDER

1 HP, 110V, 8 amps, 3450 RPM, all ball bearing motor; Overall height: 40"; Table tilt 0° to 50°; Table surface: 6-1/2" x 12-3/4"; Two position work table for disc or belt use; Disc speed: 1720 RPM; Belt: 6" W x 48" L; Belt speed: 1280 FPM; Weight: 121 lbs.

ITEM 06852-6SWA **$169.95**

DRILL MASTER

SAVE UP TO 25% FROM OUR FALL BOOK

TiN COATED FORSTNER BIT SETS

Titanium nitride runs cooler, cuts easier, and lasts longer than standard steel! Includes 3/8" shanks and individually organized wooden case. Rockwell hardness range from 55-65 HRC.

20 PC. SET

- 20 sizes from 1/4" to 3/4" by 16ths, 7/8", 15/16", 1" to 2" by 8ths

ITEM 31130-7SWA **$34.99**

16 PC. SET

- 16 sizes from 1/4" to 2-1/8" by 8ths

ITEM 32404-8SWA **$29.99**

CHICAGO Electric Power Tools

3-1/4" PLANER

- Front base has a V-groove to help guide in chamfering • 2 blade cutter
- Depth adjustment knob
- Includes rabbeting guide plate/fence, sharpening holder, blade setting jig, replacement brushes, replacement belt
- D-handle with lock-on button
- 1/10" maximum depth of cut; 3-1/4" planing width
- 110V, 5 amps, 17,000 RPM ~~$52.99~~
- 34,000 cuts per minute
- Tool wt.: 6-1/4 lbs.

ITEM 32222-3SWA **$39.99**

2 PC. REPLACEMENT BLADES

ITEM 33262-2SWA **$7.95**

CENTRAL MACHINERY

SAVE $70 FROM OUR FALL '96 CATALOG

10" PLANER

- 2 HP, 110V, 1 phase, 11 amp, 8000 RPM
- 5-1/8" working distance
- 10-1/8" x 9-1/8" feed table
- 19" x 16-5/8" x 16" overall dimensions
- 10-1/8" blade size
- 2-blade cutter head
- 61 lbs. ship. wt. • Stand sold separately

ITEM 32377-3SWA **$199.99**

CHICAGO Electric Power Tools

14.4 VOLT 3/8" CORDLESS DRILL KIT W/KEYLESS CHUCK

- Variable speed, reversible; 0 to 600 RPM
- 6 torque settings
- Includes 6 pc. drill bit set, 6 pc. screwdriver bit set, magnetic extension bit, charger, battery, *Jacobs®* keyless chuck, and carrying case

ITEM 34793-4SWA **$59.99**

14.4V BATTERY ITEM 34794-2SWA **$27.99**

DRILL MASTER **29 PC. BRAD POINT WOOD DRILL BIT SET**

ITEM 35837-1SWA **$7.99**

CENTRAL MACHINERY

1" BELT/5" DISC SANDER

Remove the belt back plate and sand all types of curves and odd shapes. With the back plate in place, you can apply pressure for faster stock removal.

- Motor: 1/3 HP, 2.4 amp, 60 Hz, 110V, 3450 RPM • Dust collection
- Table: 5" x 5", tilts to 45°
- Belt length: 30", 3350 FPM belt speed
- Shipping weight: 19 lbs.

~~$59.99~~ ITEM 34951-1SWA **$49.99**

CENTRAL PNEUMATIC CONTRACTOR SERIES

1/4" CROWN AIR STAPLER/18 GAUGE BRAD NAILER KIT

Use 18 gauge staples with 1/4" crowns for a variety of jobs. Change to 18 gauge brads for molding, trim, and more! Features non-slip rubber grip.

- Includes: (2000) 18 gauge brads, (2000) 18 gauge staples
- Brad length: 5/8" to 1-1/8"
- Staple length: 1/2" to 1-1/8"
- 100 brad capacity, 110 staple capacity
- 100 PSI maximum pressure
- 1/4" NPT • 3 lbs. tool weight

ITEM 35673-1SWA **$109.99**

4039

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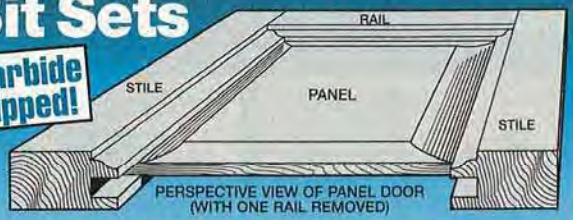

Make Beautiful Raised Panel Doors with your 1/4" or 1/2" Router, or with your 1/2" or 3/4" Shaper.

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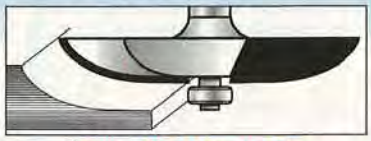
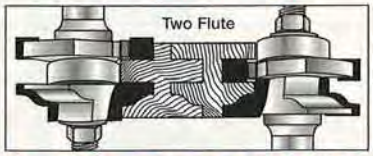


*Raised Panel Router Bit



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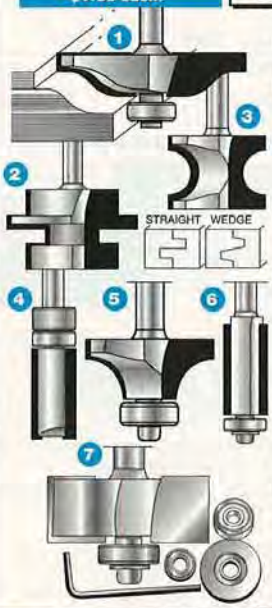

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Western HEMLOCK

The softwood that's not just for framing anymore

Thriving in the deep, damp forests of the Pacific Northwest, western hemlock rivals Douglas fir as preferred construction lumber. Yet in its beauty, this tree ranks ahead of all other conifers.

Western hemlock is a dignified tree. It grandly stands with pendulous branches and fronds of flat needles that provide it with a deep-green, lace-like coat.

Although known in the past primarily as a construction species, western hemlock has developed new admirers. Called a "white" wood in the industry, it resembles pine. But planing and sanding bring out an enhancing luster. That's why it now draws more notice as paneling, doors, flooring, even cabinets and furniture.

Wood identification

Western hemlock (*Tsuga heterophylla*) has three American relatives. Of them, only eastern hemlock has commercial importance.

In North America, the greatest quantity of western hemlock grows in the coastal rain forests of Alaska and British Columbia, followed by Washington and Oregon. But you'll find it nearly to San Francisco on the south and east into Idaho and Montana.

Where it grows heaviest, trees may reach 200' heights with diameters of 8'. Mammoths such as these may be nearly 500 years old.

With a narrow, pyramid-shaped crown and an almost taperless trunk covered by deeply furrowed, russet-brown bark, western hemlock stands out. Its flat, dark green, and glossy needles dotted by short cones make it easy to identify.

Western hemlock's wood ranges from creamy white to yellowish brown. It weighs about 29 pounds per cubic foot air-dry. The wood also is hard, strong, straight-grained, fine-textured, and nonresinous.

Uses in woodworking

Except for the heaviest construction, western hemlock always has been a mainstay for framing lumber because it firmly holds nails and screws. The wood has a reputation for termite resistance, too. If used outdoors untreated or unfinished, it will decay.

Natural range

Western hemlock's attractiveness, good machining and finishing qualities, plus wear-resistance, make it ideal for staircase components, doors, windows, and other millwork. The availability of clear, straight boards has brought it into the shops of cabinetmakers.

Availability

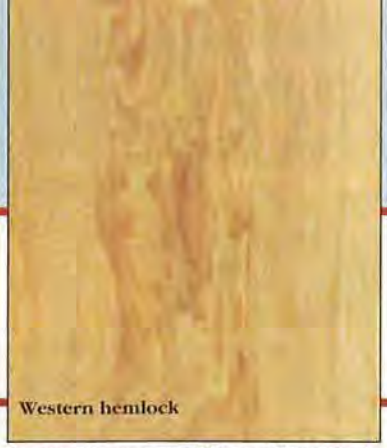
Wood-products producers market western hemlock with White fir, Grand fir, Noble fir, and other firs that have identical working, appearance, and performance characteristics and call the lumber HEM-FIR. If you live in the West, your chances of buying pure hemlock substantially increase. You'll want the clearest wood for furniture and cabinets: B & BTR SEL, C SEL, D SEL (Western Wood Products Assoc., USA finish grades) or Canadian grades No. 2 CLR & BTR, No. 3 CLR, and No. 4 CLR. For the lowest moisture content, demand boards dried to 15 percent ("MC 15" in the trade). Your cost should be about $1 or less per board foot.

Continued

PERFORMANCE PROFILE

western hemlock

(Tsuga heterophylla)



Photograph courtesy of Western Wood Products Assn.

You won't find western hemlock finish- or appearance-grade boards kiln-dried to anything less than about 12 percent. That's typical for western softwoods. That doesn't mean that the wood can't be used for cabinets and furniture, though. But you'll have to acclimate the wood in your home for a week or so to stabilize it. Then, keep the following advice in mind when working your chosen wood.

Machining methods

Western hemlock is considerably harder than its eastern relative, yet you won't have difficulty working it with hand tools.

• Beware cutting any wood that includes knots, however. They tend to be brittle and break easily. Your best bet: Lay out the work to avoid them, or keep them toward the inside of your cuts.

• Sometimes, you can't avoid machining stock with knots, so you treat them tenderly. In thicknessing, for instance, use sharp knives and reduce the cut to 1/32" or less. On the jointer, also minimize the cut, and drastically reduce the feed rate at knots.

• Western hemlock, unlike Douglas fir, won't easily splinter or tear out when crosscut or otherwise machined across the grain. Still, for the cleanest cuts, keep a backing board in place.

• Plan on drilling pilot holes for screws in western hemlock. And if you're going to nail near the ends of a board, predrill.

• Because this wood is for all purposes resinless, you won't have to seal knots with shellac to prevent bleed-through. You should, however, seal or condition flat-sawn wood before staining, That's because western hemlock when flat-sawn displays a growth-ring pattern of hard-then-soft that fights even staining.

• To preserve hemlock's natural light color, think about using a water-based clear finish. It won't yellow as easily as a traditional lacquer or varnish.

Carving comments

• There's little difference in actual hardness between western hemlock's earlywood and latewood, resulting in an even texture that takes detail.

• Use stop cuts or this straight-grained stock may trick you into taking off more than you want to.

Turning tips

On the lathe, western hemlock becomes a turner's dream. It has no resin, no odor, and doesn't impart taste. Use it for anything from chair legs to egg cups!

SHOP-TESTED TECHNIQUES THAT ALWAYS WORK

Any exceptions pertaining to this issue's featured wood species appear under bold-faced headings elsewhere on this page.

•For stability in use, always work wood with a maximum moisture content of 8 percent.

•Feed straight-grained wood into planer knives at a 90° angle. To avoid tearing, feed figured or twisted grain at a slight angle (about 15°), and take shallow cuts of about 1/32".

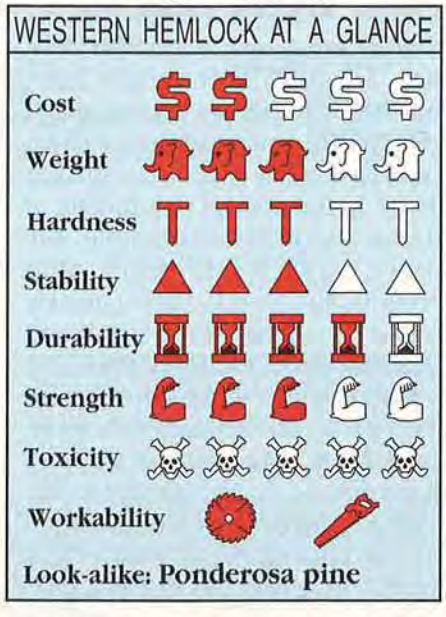
•For clean cuts, rip with a rip-profile blade having 24-32 teeth. Smooth cross-cutting requires at least a 40-tooth blade.

•Avoid using standard twist-drill bits. They tend to wander in the wood and cause breakout. Use brad-point bits and a backing board under the workpiece.

•Drill pilot holes for screws.

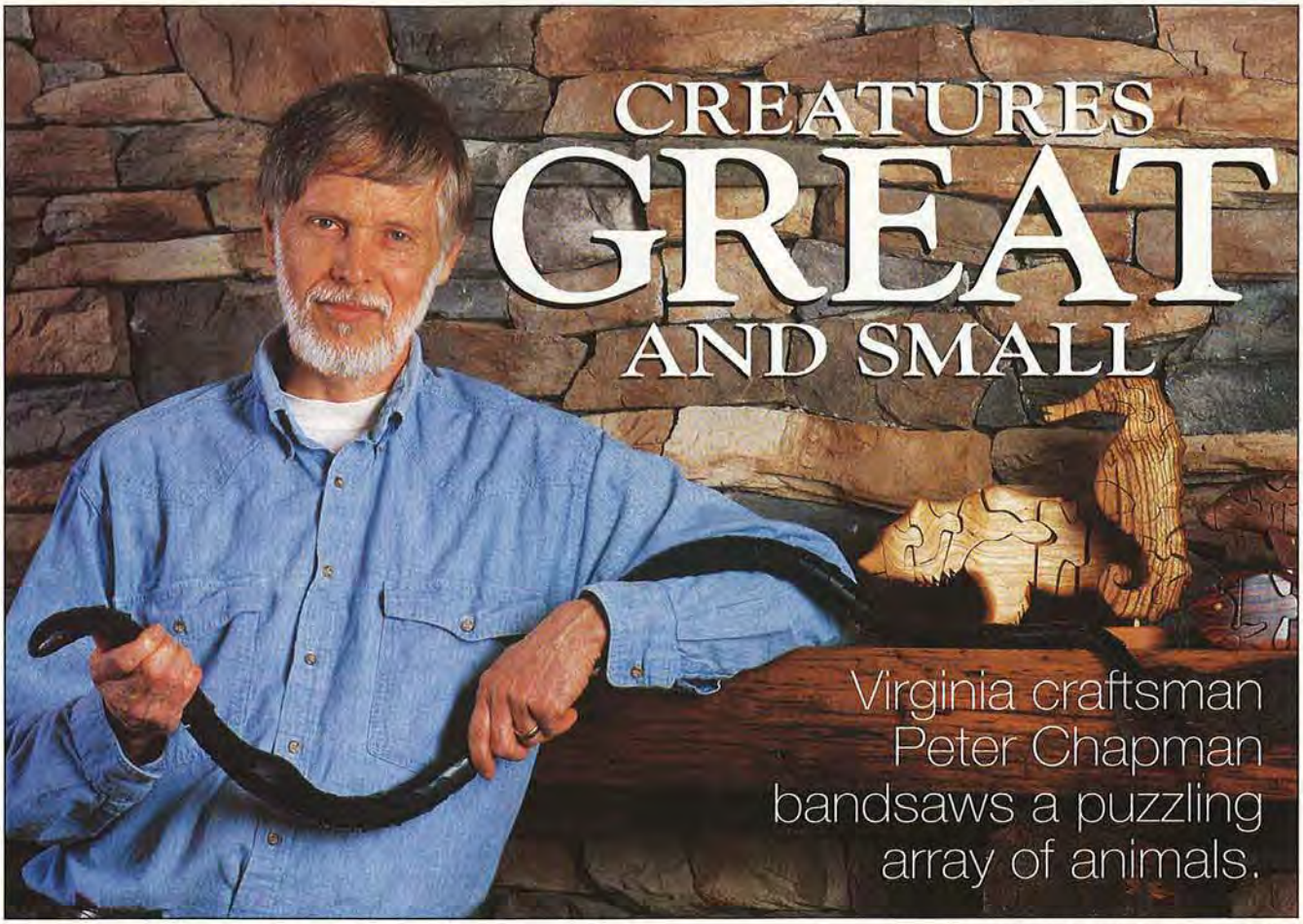
•Always rout with sharp, preferably carbide-tipped, bits and take shallow passes to avoid burning.

•Carving softwoods generally means fairly steep gouge bevels—20° or more—and usually deeper cuts.



Compiled with woodworkers Jan Hale Svec and George Sweet Illustrations: Steve Schindler

CREATURES GREAT AND SMALL



Virginia craftsman Peter Chapman bandsaws a puzzling array of animals.

Standing at the fireplace mantel that he hewed from a chestnut beam, Peter Chapman holds a blacksnake he puzzled from ebony.

Bent Mountain. From its name, you'd never imagine that this hamlet in Virginia's Blue Ridge mountains boasts quite a zoo. But by following a winding road that meanders through hollows and down hillsides you'll eventually arrive at an aged, sagging apple barn at the edge of an orchard. In it, you'll discover bears, snakes, elephants, and prehistoric beasts, as well as a "seaquarium" of angelfish, bass, dolphins, whales, and other denizens of the deep. Visitors can't look forward to the entertainment of feeding time, though. These creatures—great and small—are made of wood.

A puzzling product to behold

Peter Chapman, 52, with his son Genesis, 26, creates the menagerie at Bent Mountain. That's his living—making and selling animals, fish, and reptiles of wood. Yet his, unlike the lifelike work of master carvers and bigger-than-life products of chainsaw sculptors, are actually three-dimensional puzzles crafted in walnut, cherry, and exotic stock.

"What I make is really a kind of kinetic sculpture," Peter says softly, his native Virginia reflected in his words. "I probably sell as many of them for adult toys as I do for kids' toys."

Saying that, the craftsman reaches across the workbench and picks up a blacksnake. Much as would a professional handler, he places one hand behind the head, then lifts the writhing body with the other. The 3'-long snake clacks and clatters as its ebony parts move against each other. "Here, take it apart," he would encourage you.

This angelfish of cherry represents just one inhabitant of Peter's aquarium of wooden fish and sea creatures.

The snake is again placed on the workbench, and carefully studied. How would one begin to dismember the thing? Aha! The eye! Your eager fingers push the dowel out of the wooden head. Suddenly, the first piece is freed. The next slides out at an angle. And the next. And the next. It's fun (even if you're deathly afraid of snakes).

About midway in the disassembly, a tiny piece flips out from within a larger one. Surprise! A tiny mouse hides inside. Your hands continue on to the tail. "Now, put it together—the

Continued

Print this article

Creatures Great and small

Inside a large bass puzzle hides a small bait fish, a feature that makes buyers eager to take them apart.

pieces can only go one way," says Peter with a smile.

In a minute or so the task is complete. Reinserting the eye locks the pieces together.

"Snakes are my best sellers," notes the woodworker. "And anytime I can put something inside a puzzle, it sells even better. Like that little mouse in the snake there. That's like a hook. Most people don't realize that they're puzzles when they first see my creatures. And having something inside gives them a whole new dimension—and gives you a reason to take it apart.

"Putting something inside isn't a whole lot of trouble, either, and it doubles the salability," Peter adds. "We even have a puzzle inside a puzzle—a big trophy bass with a puzzled bait fish inside. The possibilities are endless."

The long road to success

Three or four long miles (there are no short miles in the Blue Ridge) from the apple barn turned workshop lies what Peter calls "The house that puzzles built." It's Peter and his wife Jenny's newly completed home. The glass, cedar, stone, and cement structure that he designed perches on a ridge with a view of nothing but mixed native hardwoods and moss-covered rock outcroppings. It's a dream turned reality. And it didn't come easy.

"Looking back, I've always been a woodworker," says Peter. As his eyes move across the massive stone fireplace before him, he recalls his days as an architecture major at Virginia Technical Institute. "I enjoyed the design side of architecture, but not the business side with all the rules and regulations. So after three years, I joined the Air Force."

Peter spent his hitch as a stateside photographic interpreter, and eventually learned photography. After his discharge, he put his newly acquired skill to use doing promotional work for a rock and roll band in Pennsylvania. "When the band fizzled out, I got a job working in George Nakashima's shop in Bucks County," he remembers. "What an experience that was! Of course, I knew what oak and cherry were, but in Nakashima's shop there were woods from all over the world."

In the famed woodworker's shop, Peter began on the lowest rung of the ladder, as a sander. Still, he appreciated what he saw, and learned by observation. "I just kind of absorbed what was going on. I remember seeing the other craftsmen cutting dovetails and working with huge slabs of wood with natural edges—3' wide and 12' long. Nakashima had supervised the sawing of each log, as if it were a diamond in the rough. And because I was a finisher, I got to see the wood up close.

"That was the inspiration that started my career, although I didn't know it then," Peter continues. "After three years, I left because there was no way for me to grow in his shop. It was time to get out on my own."

The self-employment road led Peter to a spell in carpentry, then

At the radial-arm saw, Peter lays out patterns to be cut from 2"-thick air-dried cherry. He harvests walnut and cherry nearby, and mills it himself.

on to Ohio as a designer/builder. "A small group of us in our mid-twenties functioned as both architects and carpenters," Peter says. "We had a woodshop where we could produce all our own millwork. Back then, we had lots of building ideas, and were able to do them because we had the woodworking know-how."

After a few years, Peter took another woodworking-related job, as a patternmaker in a foundry. After a while, though, his home state of Virginia beckoned.

In Roanoke, Peter landed employment building reproductions of antique round oak tables. For three years, he and a helper turned out 400 tables annually, and broadened his understanding of production. "I learned to do things in order," Peter remarks. "Then the market bottomed out for the tables. I was on my own again. Yet, having done that gave me the guts to look for a shop so I could start on my own."

Peter managed to locate at least the prospect for a shop in an abandoned barn tucked into the hills near Bent Mountain. After adding insulation and updating the wiring, it served him well, as it still does today.

"Soon I was making custom furniture for people down in the Roanoke Valley," Peter says. "I learned how to do whatever was necessary to get a job done. I did some oriental pieces, Danish styles, some contemporary. Looking back, what I learned from the experience was that no matter if you're designing a house or furniture, the form really does follow the function."

Inspiration at the bandsaw

In today's craft market, Peter's puzzles have made quite a mark. There's not anything like them. And he has nearly 100 retail accounts nationwide. However, if it weren't for his brief stint as a patternmaker, his puzzles might never have been.

Jenny, Peter's wife, and Genesis, his son and right-hand man, trace top views on the roughed-out forms of puzzles-to-be. The lines will guide the sanding.

Peter recalls: "After a while, I started doing crafts fairs with my furniture, and added turned bowls to my line—I kept thinking of things that would sell better. I tried cutting boards, then bandsawn boxes, Early American quilt racks, and blanket chests. I needed something that was affordable, functional, yet one of a kind. It was slow. I was making a living, but little was going in the bank.

"Then down the line somewhere it came to me: puzzles. And the thought really went back to when I was a patternmaker. We worked with 12"-square blocks of 8/4 mahogany, and cut most of it on the bandsaw. For fun, I used to make these squiggly puzzle blocks. I puzzled them up end to end, then turned them on their side and puzzled them up again. It was really interesting."

From his furniture making, Peter had accumulated lots of scrapwood, and like all woodworkers, he hated to throw it away. Especially when much of it was exotic wood. As he remembers it, Peter decided to incorporate the puzzling process with his scrapwood. "Then, I thought of turning the wood 90° after each cut, and it made the process all the more interesting. So my first puzzled creature came from a 1×1×24" piece of wood I had.

"After I started cutting it up on the bandsaw, it sort of looked like a snake," he continues. "With the next one, I shaped the head and found out that I could really make it look like a snake. Then, it became a matter of applying the technique to different animals, fish, and reptiles. I soon found out that at crafts fairs the puzzled creatures outsold my other stuff. That was six years ago, and I've been at it ever since."

What it takes to puzzle wood

"Puzzling is such a fascinating process. It really looks harder than it is," says Peter (turn to *page 78* to give it a try). "It takes me about 30 minutes to puzzle out on the bandsaw my biggest piece, the 5' anaconda. But at crafts fairs,

Continued

Peter bandsaws these snakes into puzzles from head to tail, turning the workpiece 90° after each cut so that the pieces cleverly interlock.

no one believes that it takes so little time. I end up telling them that it takes an hour."

How does Peter do it? In his shop, the process goes quickly when he gets his hands on the wood. "The piece has to be shaped and sanded first, because it would be very difficult to shape after the pieces are cut," he notes.

Stepping up to the bandsaw, the craftsman places a 24"-long cocobolo snake on the table. He points the wooden reptile's head toward the saw's ⅛" blade (with 14 teeth per inch) and turns on the machine. Deftly, his hands direct the wood into the blade, as shown *right*. "With the snake on its stomach, I make the first squiggle cut," says Peter. "Then, I turn it on its side to make the cut that frees the first piece. I work from head to tail all the way down, and that's the technique for all of my designs. And I don't first draw a pattern on the wood. I cut by eye, always making the next cut relate to the one before. No two cuts can ever be the same."

After Peter has puzzled a piece, he drills through its head (or leading piece in the puzzle) to allow the insertion of a small dowel, which usually serves as the eyes. This locks the puzzle's pieces together. Then, all it takes is a light touch of 120-grit sandpaper to knock off any wood fibers raised by the bandsaw blade.

Next, the creature gets two coats of clear tung oil on its surface. He leaves the exposed wood inside the cuts unfinished because any later movement won't interfere with the creature's loose joints. "There's nothing critical here to protect," says Peter.

More critical than the puzzles' finishing, though, is Peter's choice of wood. The stock must be well-seasoned or kiln-dried hardwood. Other than that, he has two criteria: The wood must be strong, of course. And it has to look right.

"Part of the fun of making these puzzles is finding wood that matches and adds to their look. Open-grained wood, such as oak, looks terrible. On the large rattlesnake, for instance, the zebrawood's close grain and figure give it a natural appearance, even if it's fanciful," says Peter. "Whenever I find a neat wood that works, I add it to the line."

The wood also has to fit the production process. "It has to do with the species' cellular structure, not the density," he explains. "Because it's not so much the cutting, but the sanding. The wood can't have a tendency to burn. Right now, the stock inventory includes walnut, cherry, bubinga, padauk, ebony, zebrawood, cocobolo, tulipwood, and leopardwood."

Eventually, as his son Genesis takes over more and more responsibility in their business, Peter would like to bring his creatures, or at least their concept, to a larger scale. "How about huge puzzles as abstract sculptures for display? I might even open up a log and puzzle up half of it," he says inquiringly. "Whatever I do, I know how design works with me—something else grows from working out an aspect of what I'm presently doing. What a puzzling future it's going to be!" ♣

Made from zebrawood, the 4' rattlesnake closely resembles the real thing. It sells for $300. The bear is crafted from cherry and has a $100 price tag.

See all Peter's puzzles

For a brochure describing Peter Chapman's puzzled creatures, send a business-sized SASE to:
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Written by Peter J. Stephano
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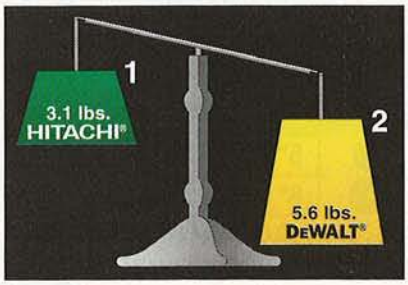

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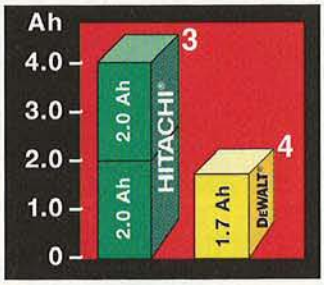

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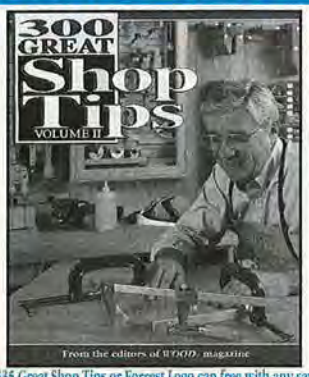

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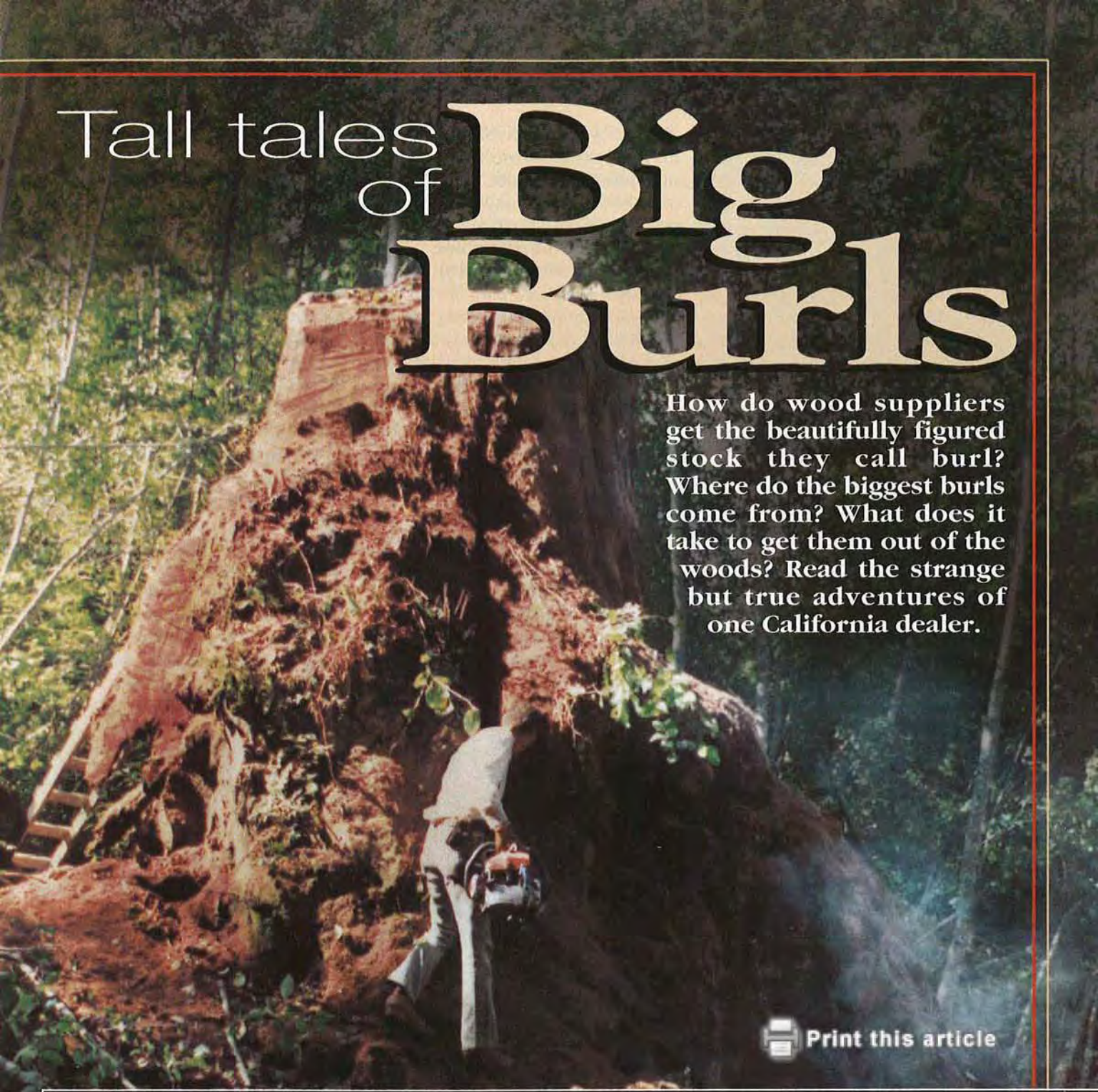
Tall tales of Big Burls

How do wood suppliers get the beautifully figured stock they call burl? Where do the biggest burls come from? What does it take to get them out of the woods? Read the strange but true adventures of one California dealer.



Print this article

A few years ago on a visit to Oregon craftsman Michael Elkan, known for his burlwood band-sawn boxes, I became intrigued by his stockpile of huge burls, some weighing 1,000 pounds. As a Midwesterner, I was only familiar with bowl-sized bumps on the trunks of some maples and oaks.

Later, on a trip to northern California, I saw roadside retail outlets for redwood burls. Mostly slabbed, they ranged from plate-sized to tabletops that could accommodate dinner for eight.

More than ever, I wanted to find out about big burls and where they came from. What I discovered was that the burl business is akin to used car parts: You can buy about anything, but don't ask questions. The names of burl harvesters I was given were always accompanied by disclaimers. Finally, I reached Bruce Remington, of The Burl Tree in Eureka, California. He's dealt in redwood burls (and other species) for three decades. And Bruce had some fascinating stories. Here, I'm sharing two of his best.

Peter J. Stephano

—Peter J. Stephano, Features Editor

Continued

Big Burls

Myrtle Burl

No matter where burls grow on a tree—at the base, in the root system, or along the trunk—they all seem to originate in similar ways, according to Bruce Remington, 54. "Burls could be considered similar to human tumors or carbuncles and warts," he explains. "If you look at a burl closely, it has grain similar to wart tissue—it grows in layers and patterns. [See examples, *right.*] A burl starts from an injury or disease in the tree. The tree tries to kill it by isolating or restricting its growth—like a war going on—by producing a burl around it from the first year. And the burl grows with the tree.

Buckeye Burl

"I've found that a burl can become twice the diameter of the tree," Bruce continues. "And they don't necessarily bulge out. They grow in different shapes and directions, and can even put out roots."

The largest and best burls are at or below ground level, Bruce believes. He calls them crown burls. "And they're barely visible," he says. "Other burls, on tree trunks, can get fairly large in bigleaf maple or madrone, but nowhere near the size found in redwoods at ground level. In northern California, they're hard to find because they're so overgrown with brush that they look like part of the hillside (see photo, *preceding page*). So when you find a redwood crown burl, it's usually because you happen to trip across it, and that's exactly what I did one time."

Remembering, Bruce's eyes light up. There's a story about to begin.

Bruce harvests the Eldorado Burl

"I've dealt with tens of thousands of burls, but the one I'm most proud of is the one I call the Eldorado Burl, which I found on Louisiana Pacific land near Big Lagoon, California," says Bruce, his voice rekindling 15-year-old excitement. "I was roaming around the woods looking for redwood stumps pushed out by early loggers when I stumbled upon this great redwood crown burl. It was huge at the base—over 40' in diameter—and had two trees growing out the top. I paid $2,100 for it, and figured I bought a $600,000 burl."

Getting the mammoth burl off the land, though, proved more difficult than driving the bargain. Bruce describes it as if it happened only yesterday:

"We had a 20' ladder, but it only reached two-thirds up the slippery burl. It was a gargantuan task to saw the thing up, and everything went wrong. We took in my 80,000-pound HD-20 Allis Chalmers track loader and immediately got it stuck. Then, I had a young guy to work as a climber. He went up the

ladder, fell off the burl, and quit. So there I was, left with a 52-year-old helper and two Stihl chainsaws with 8' bars to hack it up.

"My plan was to saw from the top and split it up like a 40'-diameter pie," Bruce continues. "We started with six cuts at 5' or 6' intervals down into the burl. Next, I hooked up the loader with its winch and tried to pull the burl parts loose. But it didn't work well. Eventually, with about 250,000 pounds of force, we managed to peel off one big chunk—something like 30' long by 4' wide and 8' thick—weighing some 50,000 pounds.

"When we got that off, the rest became easier," says Bruce. "We could then get into an abandoned bear's den in a hollow of the burl and saw from there. So we sawed and ripped off more pieces. Finally, we had 10 chunks to pack out on the loader to my rig—a semi with a 28' trailer fitted with a crane. Anyway, we struggled to legally load those 30'-long chunks one, two, or three to a load and haul them to Eureka. All in all, it took us two weeks, but I estimate there was 500,000 pounds of good wood in that burl."

Madrone Burl

The burl that got away

Fishermen always have a story about "The One That Got Away." There's room in the burl business for such a story, too. And Bruce relates it with chagrin.

"The largest burl ever, in my opinion, was in a swamp area that in the early seventies became part of Redwood National Park," he recalls. "This redwood burl was unbelievable. There must have been a grandfather tree there that sent out suckers to form a ring of trees. What I saw was about six or eight trees of 6-10' diameter connected with one burl! It stood at least 25' high over a 100' distance—a wall of burl 10-15' thick! I estimate it at a million pounds.

"My bid for that burl was $8,500, which was more money than I had, but it wasn't enough," Bruce says with a sigh. "My competitor had veneer [manufacturing] contacts, and he bid $20,000. I've heard that he got $100,000 for it. That same burl now would start at $1 million, and veneer people would mark it up 10 to 50 times selling it by the square foot. It would be a $10 to $50 million burl."

A black market in burls

In California, burl loggers must have a limited timber operators permit. "In getting burls, there's a big insurance liability because you could do a lot of damage," notes the burl dealer. "A fire sparked by a chainsaw can burn acres of good logging timber. That's one reason there's not much burl logging anymore: Just not enough money for the liability."

There is, however, another level of the burl business. Bruce explains, "Most big timber companies don't want burl gatherers on their property. But their tree loggers like to pick up beer money or better, so they just whack off slabs from a redwood burl or madrone or whatever and sell them—in essence black-marketing. I'd be in quite a lot of trouble if I didn't have a lot left. I'm in the heart of the redwoods and believe me it is more than difficult to get this stuff at all now."

Burls to your door

For a detailed sales list of burls and other wood, write Bruce at The Burl Tree, 3527 Broadway, Eureka, CA 95503, or call 800/785-BURL. When traveling in northern California, stop by. The Burl Tree is on US 101.

In his storage yard, Bruce cuts slabs with his chainsaw from a huge redwood burl left over from the "old days."

How to spot good burl

Never cut burls from a living tree. But if you find what you think is a burl on a dead or downed tree, here's Bruce's advice for checking it out. "Establish how solid the burl appears. If you spot decay on the outside, it probably goes all the way through. And many growths on trees are not true burls at all, but have straight grain. So read the bark, looking for swirls and patterns, because what you faintly see outside exactly reflects what's inside. If it looks good, slice it off with a chainsaw."

Crown burls are less easy to spot. Bruce suggests looking at any outward flaring or protuberance of a tree's trunk or stump from a distance to evaluate possible burl structure just below ground. Then move in to inspect for defects. He notes, too, that few crown or root burls are of high enough quality to merit digging up because of all the work and expense involved. "Better to prowl land clearing sites or road building operations where root and crown burls may already be out of the ground."

Written by Peter J. Stephano
Photographs: Bruce Remington

A grand Entrance

This mat is several steps above the ordinary

As guests to your home step admiringly across this distinctive mahogany and white oak welcome mat, you'll be proud to tell them you made it yourself. But you don't have to tell them just how easy it was.

Cut the frame parts first

1 Cut the frame sides and ends (A and B) 1" longer than shown on the Bill of Materials. Mark the top face of each with tape.

2 Center a ¼" groove ¼" deep along the inside edge of each frame end (B). A tablesaw with a ¼" dado blade does the job easily.

3 Miter-cut parts A and B to the finished length shown. (To cut the joints accurately, we used a tablesaw with a sliding table.)

4 Refer to the Frame Full-Sized Pattern on *page 45*, then cut the ⅛" spline slots where shown on the ends of the frame parts. Saw the slots, or follow this procedure to do it with a slot cutter chucked in a table-mounted router:

Mark the slot's stop point on the router-table fence. Then, to make the slots, adjust the table-mounted router to position the cutterhead 3/16" above the table surface. Slot one end of each piece, keeping the marked surface facing up. Then, reset the cutter height to form the slots in the other ends. To do this, place one of the slotted pieces on the router table with the marked face down. Raise the router so the cutterhead slips into the slot. Lock in this setting, then rout the remaining slots.

5 Cut two notches in the bottom of each frame side (A) where shown in the Notch Detail drawing *opposite page*. To form the notches, mark centers 8⅞" from the short corner of each miter and ⅝" from the inside edge of each part. At the centers, drill ⅜" deep with a ¾" Forstner bit, using a drill press for accuracy. Drill a 7/64" pilot hole ¼" deep into the middle of each hole. Complete the notches with a chisel.

6 Rip a piece of ⅛" stock at least 18" long to 15/16" wide. Cut four 3½" lengths from it, and sand or saw one end of each to match the rounded spline slots. Place the splines in position, and dry-assemble the frame to check its fit.

Print this article

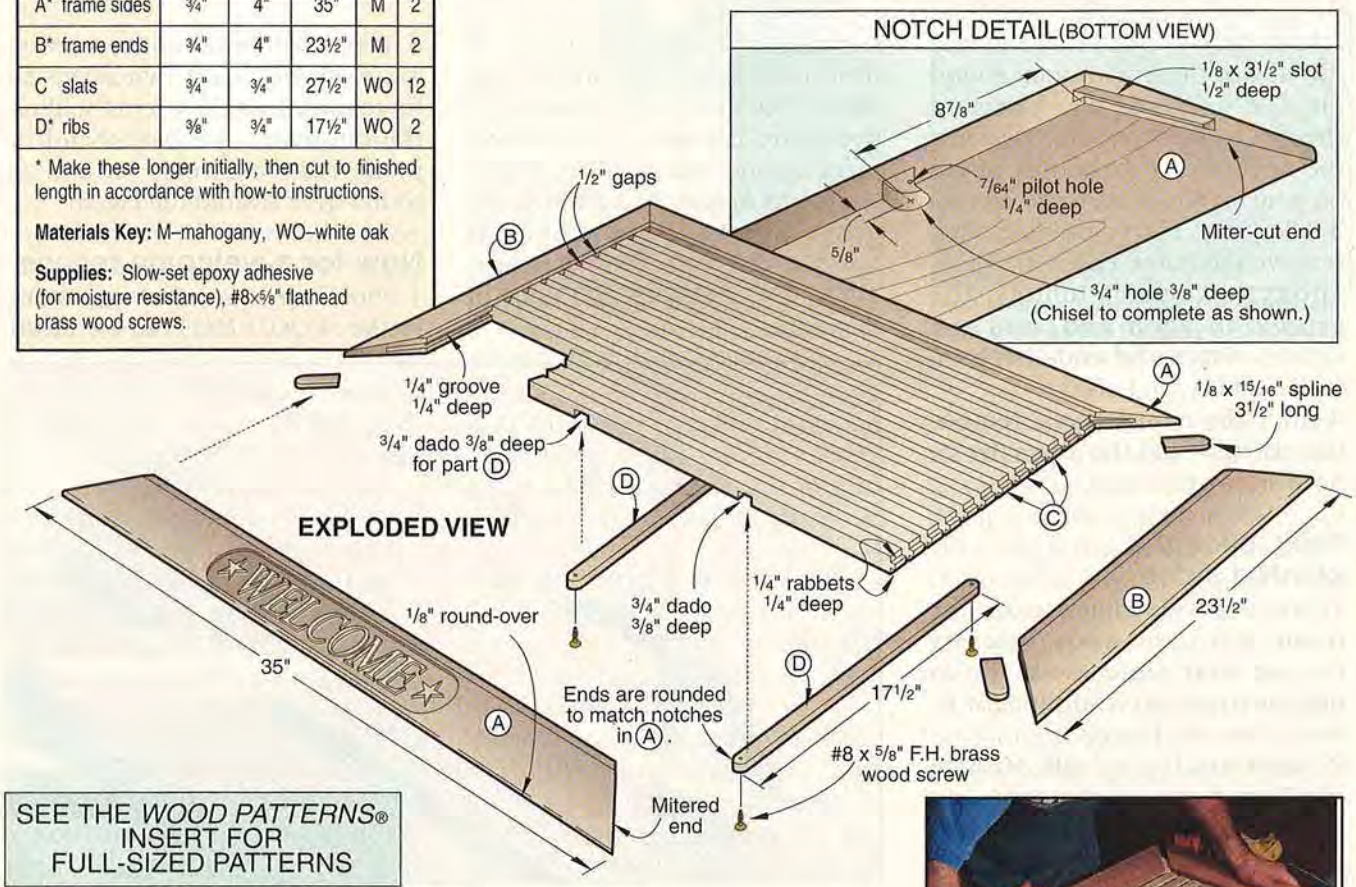
Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
A* frame sides	¾"	4"	35"	M	2
B* frame ends	¾"	4"	23½"	M	2
C slats	¾"	¾"	27½"	WO	12
D* ribs	⅜"	¾"	17½"	WO	2

* Make these longer initially, then cut to finished length in accordance with how-to instructions.

Materials Key: M–mahogany, WO–white oak

Supplies: Slow-set epoxy adhesive (for moisture resistance), #8×⅝" flathead brass wood screws.



SEE THE *WOOD PATTERNS®* INSERT FOR FULL-SIZED PATTERNS

Then, saw the slats

1 Cut the slats (C) to the sizes shown. For contrast, we used white oak for the slats and ribs in our mahogany-framed doormat.

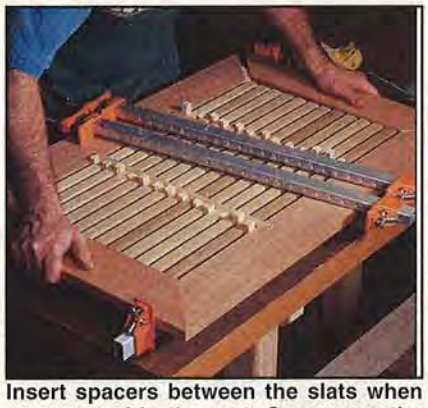
2 Form tenons on the slat ends by cutting ¼" rabbets ¼" deep in the top and bottom faces at both ends of each slat (C). Set up your miter gauge with an auxiliary fence and a stopblock to ensure uniformity. Sand slight chamfers on the tenon ends.

3 Dado the slats where shown by the Front Section View *next page*. These dadoes must line up with the notches in the frame sides (A) to accept the ribs (D). So, verify the locations before cutting the dadoes. Cut them with a ¾" dado blade, again employing an auxiliary fence and stopblock.

4 Cut two ⅜×¾×18" pieces of white oak for the ribs (D). Mark a center ⅝" from each end. At each center, draw a ⅜"-radius arc for the rib ends. Drill and countersink a 5/32" shank hole at each center. Bandsaw the rib ends slightly outside the radius lines, then sand down to them with a disc sander.

Now, assemble the mat

1 Cut 26 ½×½" spacers, each about 1½" long. Insert the spacers between the slats as you dry-assemble the frame sides, ends, slats, and ribs. Refer to the Exploded View drawing as you assemble the mat. For easiest assembly, work with the mat upside down, that is, with the ribs up. Slip the splines into their slots to align the miter joints, and clamp, as shown *above*. Check the assembly for square and fit.



Insert spacers between the slats when you assemble the mat. Square up the assembly as you clamp it together.

2 With the assembly still clamped, remove the ribs (D). Spread epoxy adhesive (for moisture resistance, we used slow-setting epoxy) into the dadoes in the slats (C) and the notches in the frame sides (A). Place the ribs (D) back in place, and secure with #8×⅝" flathead brass wood screws. (Don't substitute steel

Continued

Grand Entrance

screws here—later you'll run into the tips of them with your router bit. The soft brass won't damage the bit as steel would. Besides, the brass won't make rust marks on your porch or stain the wood.)

3 Allow the epoxy to cure, then remove the frame ends (B). Apply epoxy to the slat tenons, the groove in each end, and the splines. Place the ends back on the assembly, and clamp.

4 After the epoxy cures, remove the clamps. Sand the joints flat on both sides of the mat.

Next, slice the slanted sides

1 Saw the wide chamfers on the frame sides and ends. Start by raising your tablesaw blade as high as it will go, and tilting it 8° away from the fence.

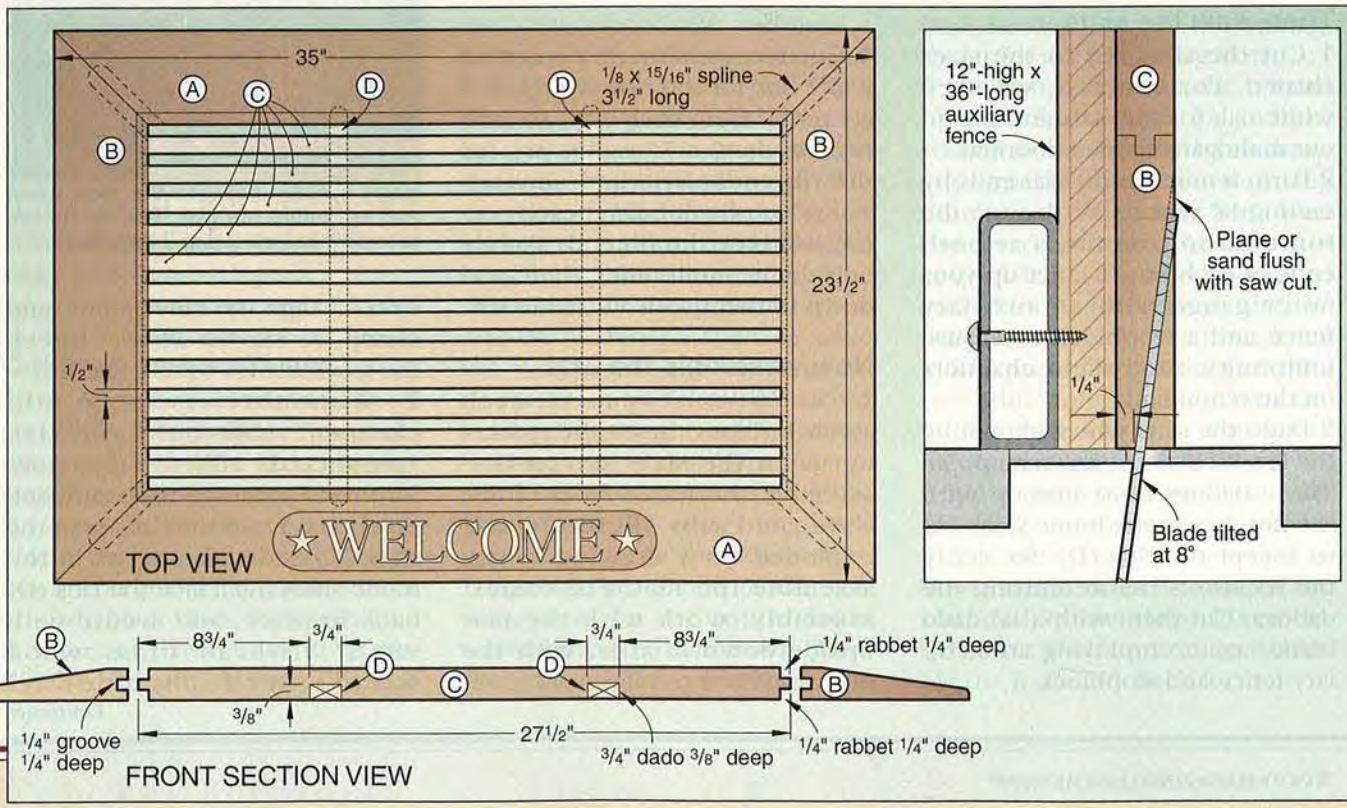
2 Next, attach a 12"-tall, 36"-long auxiliary fence to the saw's rip fence. (A piece of plywood or particleboard screwed to the fence would do the trick. Ensure that the face of the auxiliary fence stands perpendicular to the saw table.) Position the fence ¼" from the blade, measured at the table. Place a feather board to press the bottom of the workpiece against the auxiliary fence, as shown *below*. Make a test cut on scrapwood, and check it against the Full-Sized Pattern. Then, saw the sides and ends of the mat.

3 The blade will not cut away quite all the wood that needs to be removed, as shown in the illustration *below*. So, block-sand or plane the chamfers. Sand a ⅛" round-over around the edge.

Now for a welcome recess

1 Photocopy the lettering pattern in the *WOOD PATTERNS*® insert

The combination of a tall auxiliary rip fence and a feather board allows you to saw the wide chamfers safely. Because the blade doesn't cut quite deeply enough, you'll need to complete the chamfers by planing or sanding.

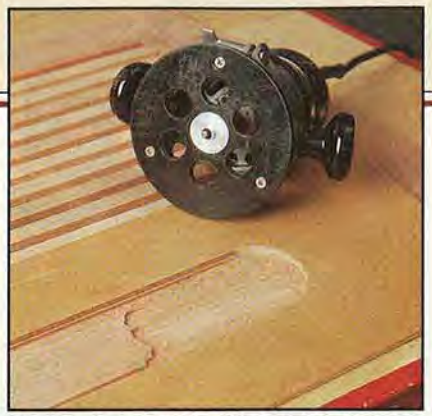


in the middle of the magazine. (Make two copies—you'll need another later.) Center the pattern on a ¼×9×24" piece of hardboard. Stick it in place with spray adhesive, then cut out the oval opening—this will be the template for routing the recess in the frame side. Remove the pattern.

2 Refer to the Frame Recess drawing *below*, and lay out the location for the routed recess on one side of the frame. Attach the hardboard template in the appropriate position with double-faced tape.

3 Fit your router's base with a 7/16" (outside diameter) guide bushing, and install a ¼" straight bit. (Check with your tool dealer for the bushing to fit your router.) Adjust the router to a cutting depth of ⅜". Allowing for the template's ¼" thickness, this will allow the bit to cut ⅛" deep into the frame side.

4 Rout the recess, first cutting around the perimeter of the area then cleaning out the middle, as shown *above*. This is where you'll rout off the screw points.



Equip your router with a guide bushing to follow the hardboard template when you rout the ⅛"-deep frame recess.

Double-faced tape holds the letters and stars on the stick for easy and accurate positioning in the epoxy-coated recess.

5 Remove the template from the frame side. Lightly draw center marks on the frame at the ends of the recess, following the patterns.

Add a friendly greeting

1 Adhere another copy of the lettering pattern to a ⅛×2½×17" piece of white oak. Mark the tops of the O and the stars.

2 Scrollsaw the letters and stars. Leave the patterns attached after cutting (it helps to have them in place for later steps). Lay out the cutouts on the original pattern.

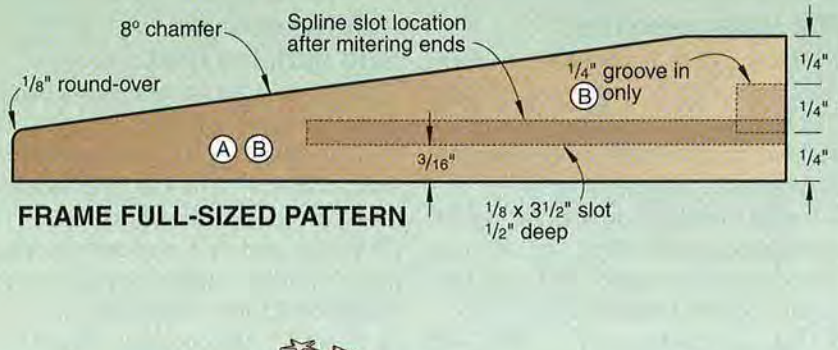
3 To make a positioning stick for the cutouts, cut a piece of scrapwood ½×¾×16 3/16". At each end on one edge, draw a center mark. Put a strip of double-faced tape along the opposite edge.

4 Aligning the marks on the taped stick with the center marks on the pattern, press the taped edge against the letters and stars arranged on the pattern. Press firmly to ensure that all the cutouts bond to the tape on the positioning stick.

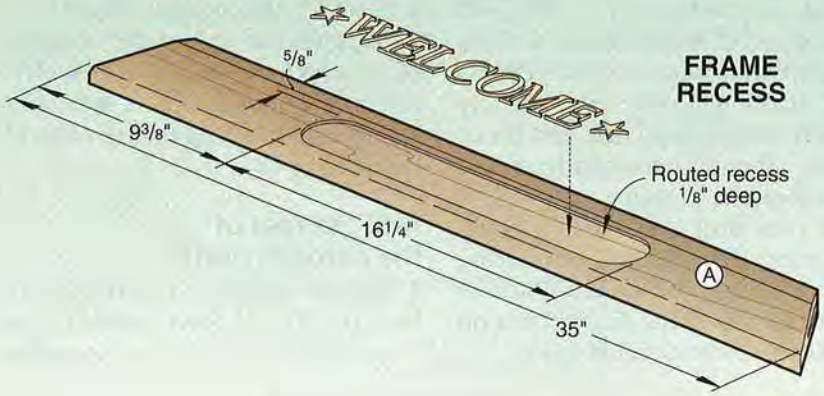
5 Mix some epoxy, and brush it into the bottom of the recess routed in the frame side. Pick up the positioning stick with the letters and stars attached, and brush epoxy onto the backs of the cutouts. Then, aligning the center marks on the stick with the ones on the frame side, press the cutouts into place, as shown *above*. Clamp the stick at the ends. Tilt the mat to level the bottom of the recess, and let the epoxy cure overnight.

6 Remove the clamps and the positioning stick. Here's where leaving the paper patterns on the letters pays off—as you twist and lift the positioning stick, the paper will peel off or tear, making removal much easier. Remove the remaining bits of the patterns.

7 Finish-sand the mat with 150- and 220-grit abrasive. Apply a clear finish of your choice. For outdoor use, choose an exterior varnish or exterior oil.



FRAME FULL-SIZED PATTERN

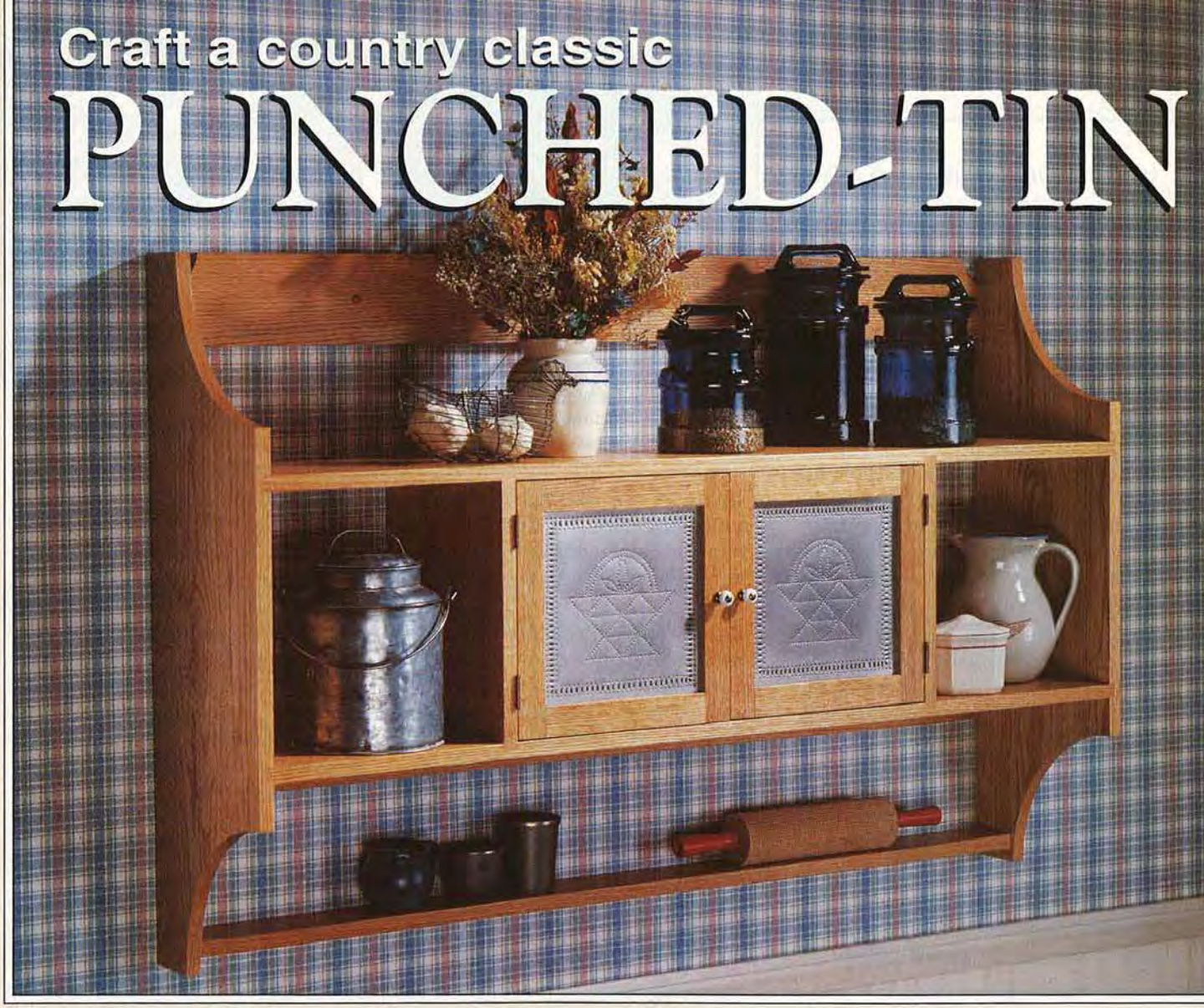


FRAME RECESS

Project Design: David Ashe
Written by Larry Johnston
Photographs: Studio Au; John Hetherington

Craft a country classic

PUNCHED-TIN



One of the most popular country projects we've published was the punched-tin pie safe from the August 1992 issue and shown at *left*.

Now, we decided to follow that project with this functional and decorative wall-hung cabinet featuring punched-tin door panels.

If you're interested in building a matching pie safe, see our offer at the end of the article.

Print this article

The ends come first

1 Edge-join narrower stock to form two ends (A) to measure slightly larger than those dimensioned in the Bill of Materials. Later trim the end blanks to size.

2 Using the End View drawing for reference, mark the locations of the dadoes, radii, and centerpoints where marked.

3 Cut the dadoes first. (We did this on our tablesaw using a miter gauge fitted with a wood extension and a stop for consistently placed dadoes from one end piece to the other.) Then, bandsaw and sand the radii to shape.

4 Fit your drill press with a counterboring bit, and drill mounting holes through the *outside* face of each end (A) to the size shown on the Screw Hole detail at *right*.

Cut the shelves and uprights next

1 Edge-join narrower stock slightly oversized for the shelves (B) and uprights (C). Later, remove the clamps, and cut the shelves and uprights to finished size.

2 Cut a pair of dadoes in each shelf where dimensioned on the Exploded View drawing.

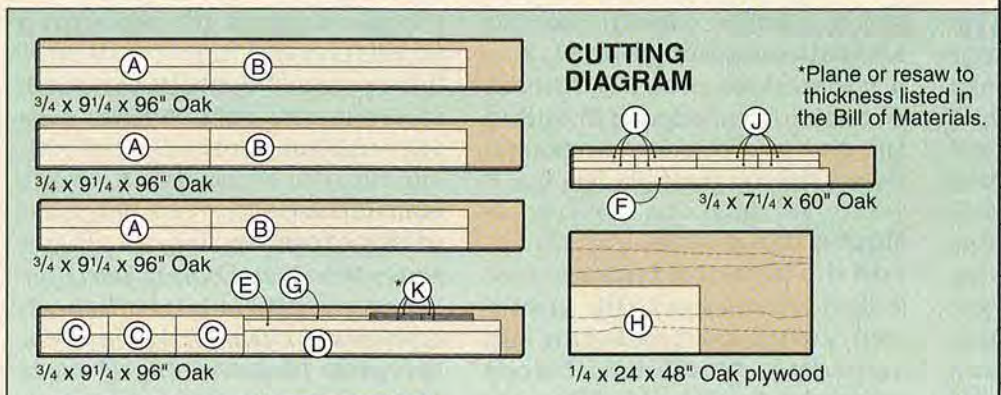
3 Test-fit the pieces together. Then, glue and clamp the uprights (C) between the shelves (B). Check for square. Then, glue and clamp the ends (A) to the ends of the shelves (B).

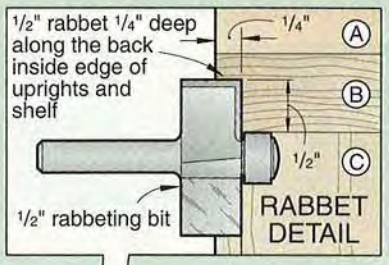
Add the rest of the carcase parts

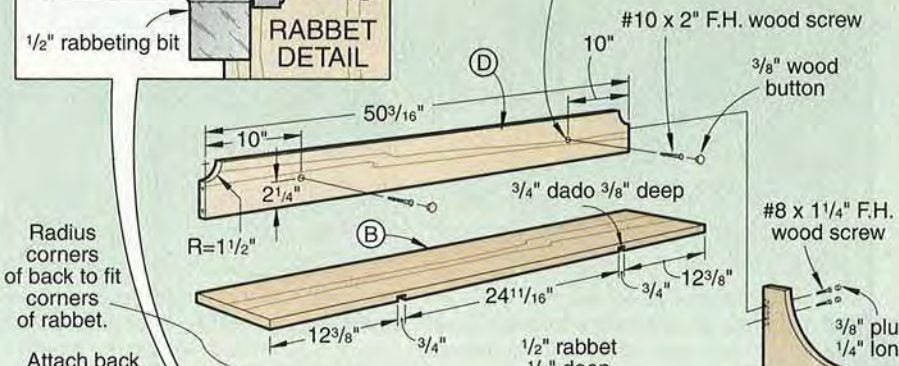
1 Before cutting the crossmembers (D, E) and lower shelf (F) to

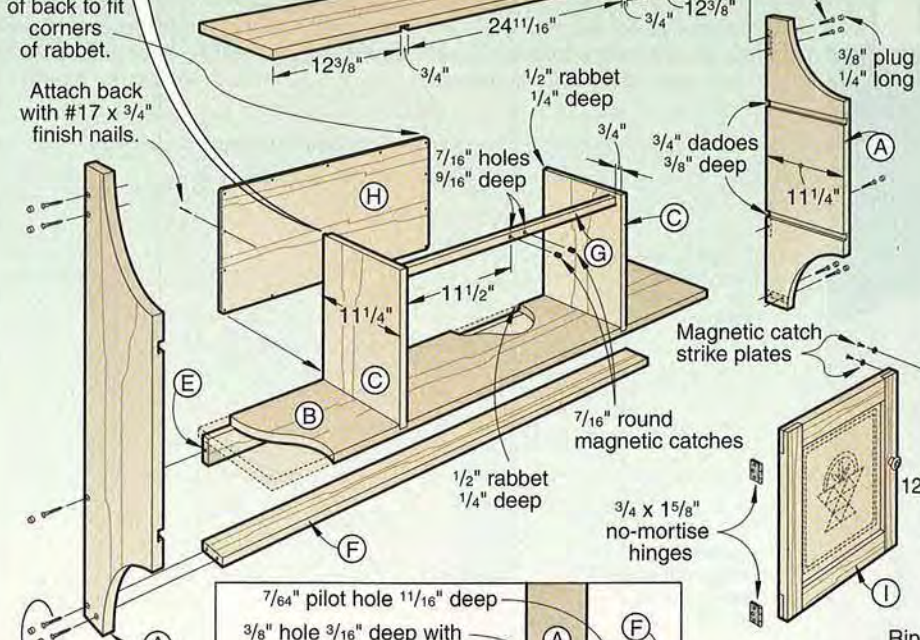
Continued

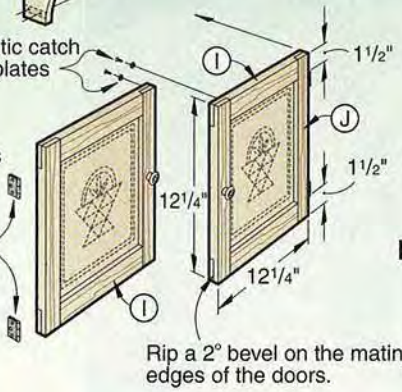
WALL CABINET



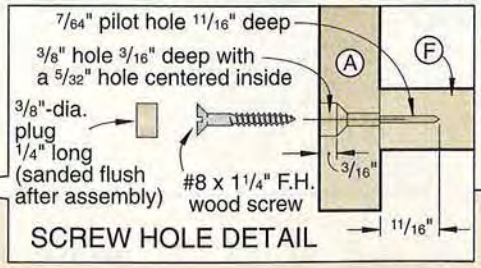








EXPLODED VIEW


7/64" pilot hole 11/16" deep
3/8" hole 3/16" deep with a 5/32" hole centered inside
A
F
3/8"-dia. plug 1/4" long (sanded flush after assembly)
#8 x 1 1/4" F.H. wood screw
3/16"
11/16"
SCREW HOLE DETAIL

Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
A* ends	3/4"	11 1/4"	34"	EO	2
B* shelves	3/4"	11 1/4"	50 15/16"	EO	2
C* uprights	3/4"	11 1/4"	13 1/8"	EO	2
D upper crossmember	3/4"	4 1/2"	50 3/16"	O	1
E lower crossmember	3/4"	2 1/4"	50 3/16"	O	1
F lower shelf	3/4"	3 1/8"	50 3/16"	O	1
G cleat	3/4"	3/4"	24 11/16"	O	1
H back panel	1/4"	13 5/16"	25 5/8"	OP	1
I door rails	3/4"	1 1/2"	12 1/4"	O	4
J door stiles	3/4"	1 1/2"	12 1/4"	O	4
K stops	5/16"	5/16"	9 11/16"	O	8

*Cut parts marked with an * oversized. Trim to finished size according to the how-to instructions.

Materials Key: EO–edge-joined oak, O–oak, OP–oak plywood

Supplies: #8×1 1/4" flathead wood screws, #10×2" flathead wood screws, two pair of 3/4×1 5/8" no-mortise hinges, #17×3/4" finish nails, two 3/4"-diameter porcelain knobs and screws, two round magnetic catches with strike plates, 3/8" wood buttons, stain, clear finish.

Buying Guide

Punched-tin panels. Two RP-1162 10×10" prepunched panels. $29.80 ppd. Add $5 for their catalog. Country Accents, P.O. Box 437, Montoursville, PA 17754, or call 717/478-4127 to order.

size, measure the distance between the ends (A). Using this actual measurement, cut these pieces (D, E, F) to size.

2 Mark and cut a 1½" radius on the top corners of the upper crossmember (D).

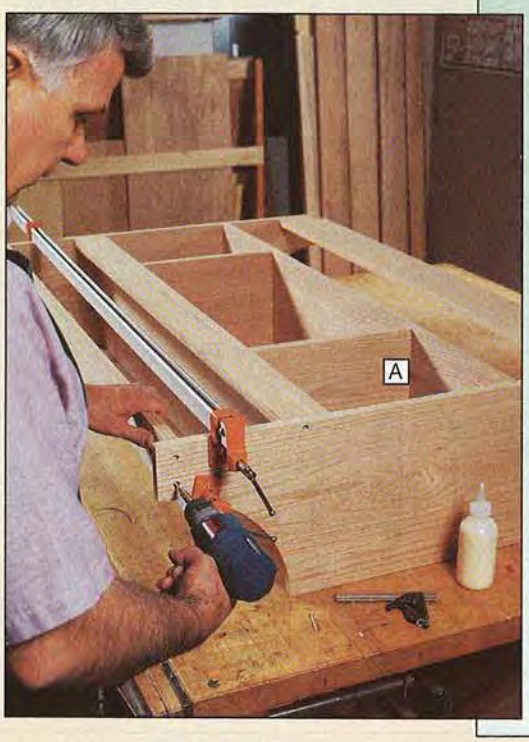
3 Clamp the crossmembers (D, E) and lower shelf (F) in place, and drive screws through the previously drilled holes as shown in Photo A *below*.

4 Cut ⅜" plugs, and glue one into each counterbored hole. Let the plugs sit overnight, and then trim them flush. If you trim them flush immediately, they'll shrink slightly as the moisture from the glue evaporates, leaving a slight depression. (For a good color match, we cut our plugs from the radiused cutouts left over when cutting the ends to shape.)

5 Measure the distance between the two uprights (C), and then cut the cleat (G) to size. Using the dimensions on the Exploded View drawing, drill a pair of holes for the magnetic catches. (We used a barrel-type catch. To install these, we drilled a pair of 7/16" holes 9/16" deep into part G. Measure your catches before drilling; we've found them to vary in size.)

6 Position the cleat (G) ¾" back from the front edge of B and C, and glue it in place to the bottom side of the top shelf (B).

Center the crossmembers and lower shelf over the previously drilled holes, and drive the screws to secure them.



Rout a rabbet and add the plywood back

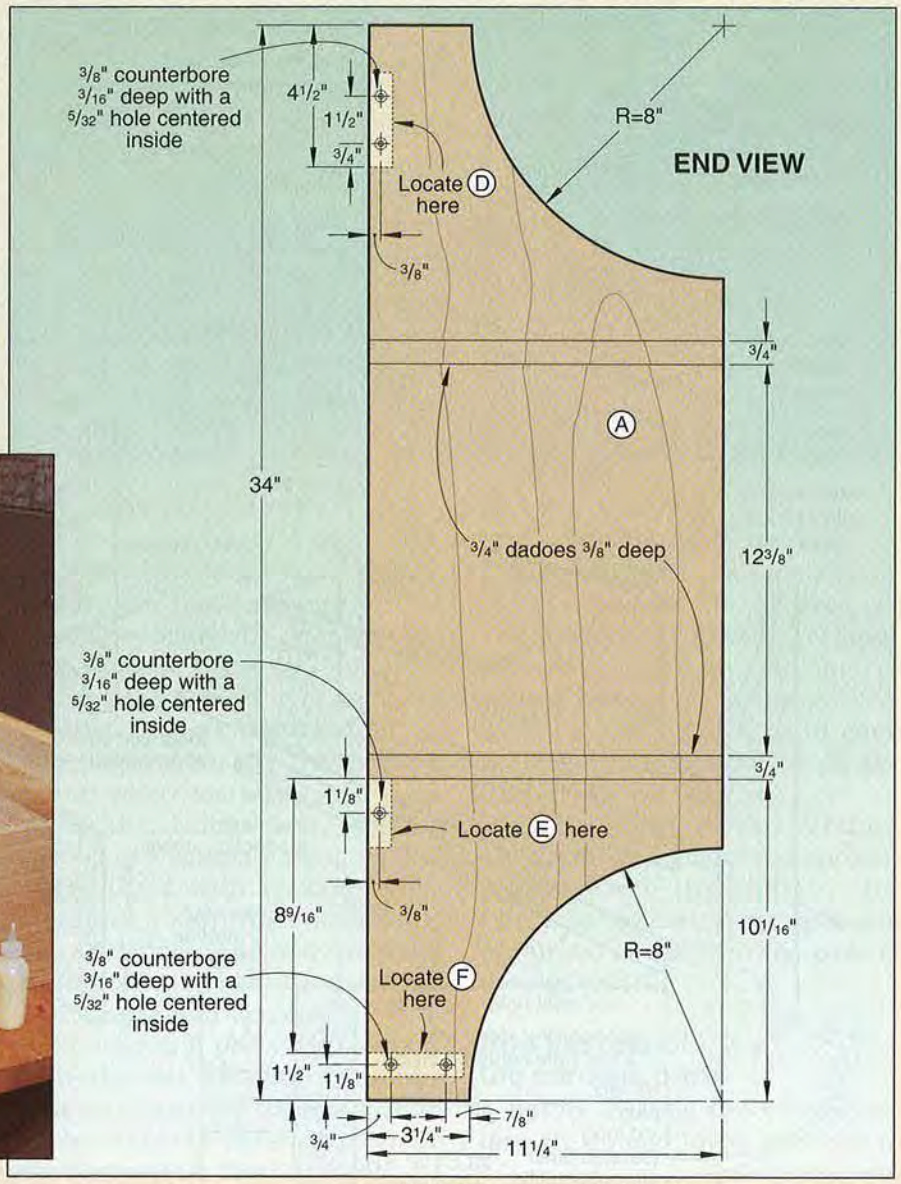
1 To house the back (H), fit your router with a ½" rabbeting bit, and rout a ½" rabbet ¼" deep along the back inside edges of parts B and C as shown in Photo B. See the Exploded View drawing for location.

2 Measure the opening, and cut the plywood back (H) to size from ¼" oak plywood.

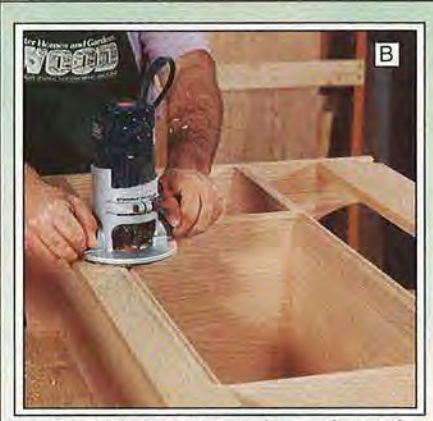
3 Don't install the back yet, you'll secure it with #17×¾" finish nails after staining it.

Half-lap a pair of door frames

***Note:** When machining parts for a critical fit such as the half-lapped door frames, always cut two extra pieces to verify joinery before cutting the project parts.*

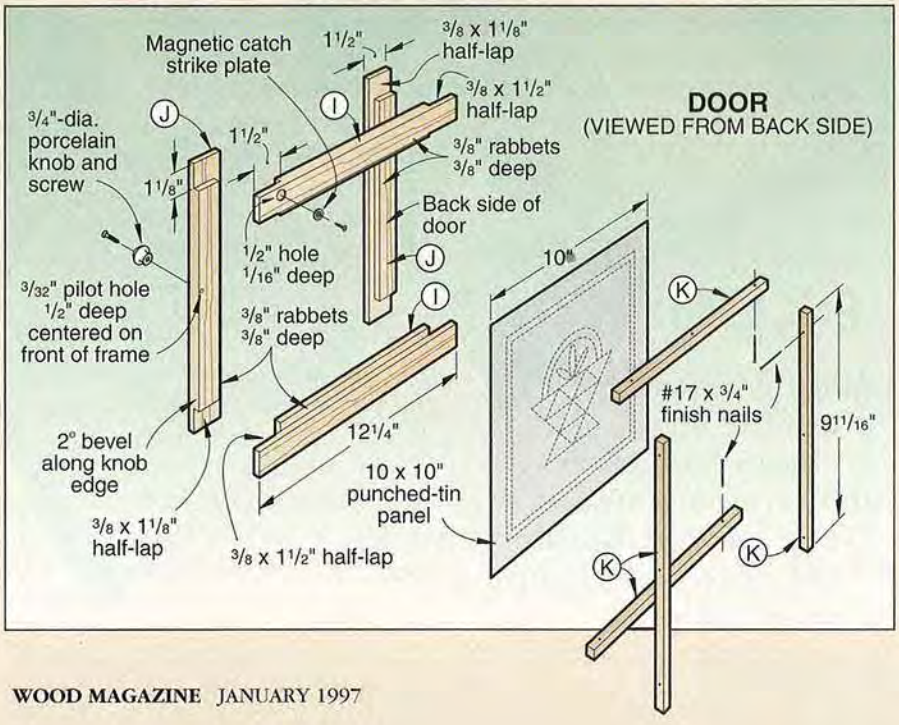


1 Cut the door rails (I) and stiles (J) to size.
2 Using a stop for consistent half-lap lengths, cut 1½"-long half-laps on the ends of the four rails (I). Note that the half-laps on the rails are 1½" long and those on the stiles are 1⅛" long. See the Door drawing *below* for reference. (We cut the extra pieces to verify the blade and stop settings before cutting the needed pieces.) Move the stop, and cut 1⅛"-long half-laps on the ends of the door stiles (J).
3 Now, with the dado blade at the same height, cut a ⅜" rabbet ⅜" deep along the back inside edge of each stile and rail where shown on the Door drawing (note that the drawing shows the view from the *back side* of the door).
4 Hold the door frames together and check the fit of the punched-tin panels as shown in Photo C.
5 Glue and clamp each frame together, checking for square.
6 Rip and crosscut the 5/16"-square stops (K) to size. Drill pilot holes for the finish nails, and set the stops aside for now.
7 Place the doors in the opening and check for proper fit. You should have a 1/16" reveal on all sides. Place a piece of masking tape on the hinge edge, and mark for a right and left door. Then, mark the knob locations. Drill the holes for the hinges and knobs.
8 Tilt your tablesaw blade 2° from vertical, and bevel-rip the mating edges of the doors. This is done so the doors don't hit each other when opening and closing. Sand both door frames smooth.
9 Screw the hinges to the doors and uprights (C). Fit the back of each door with a strike plate to match with the catch previously mounted to the cleat (G). Recess the strike plates flush with the back face of each door. Measure your catches before drilling; catches vary slightly in size.



Rout a ½" rabbet ¼" deep along the back inside edge of the carcase frame to house the plywood back.

Cut the half-lap joints and rabbets, and then check the fit of the tin panels in the rabbeted opening of each door.



Remove the hardware and add the finish

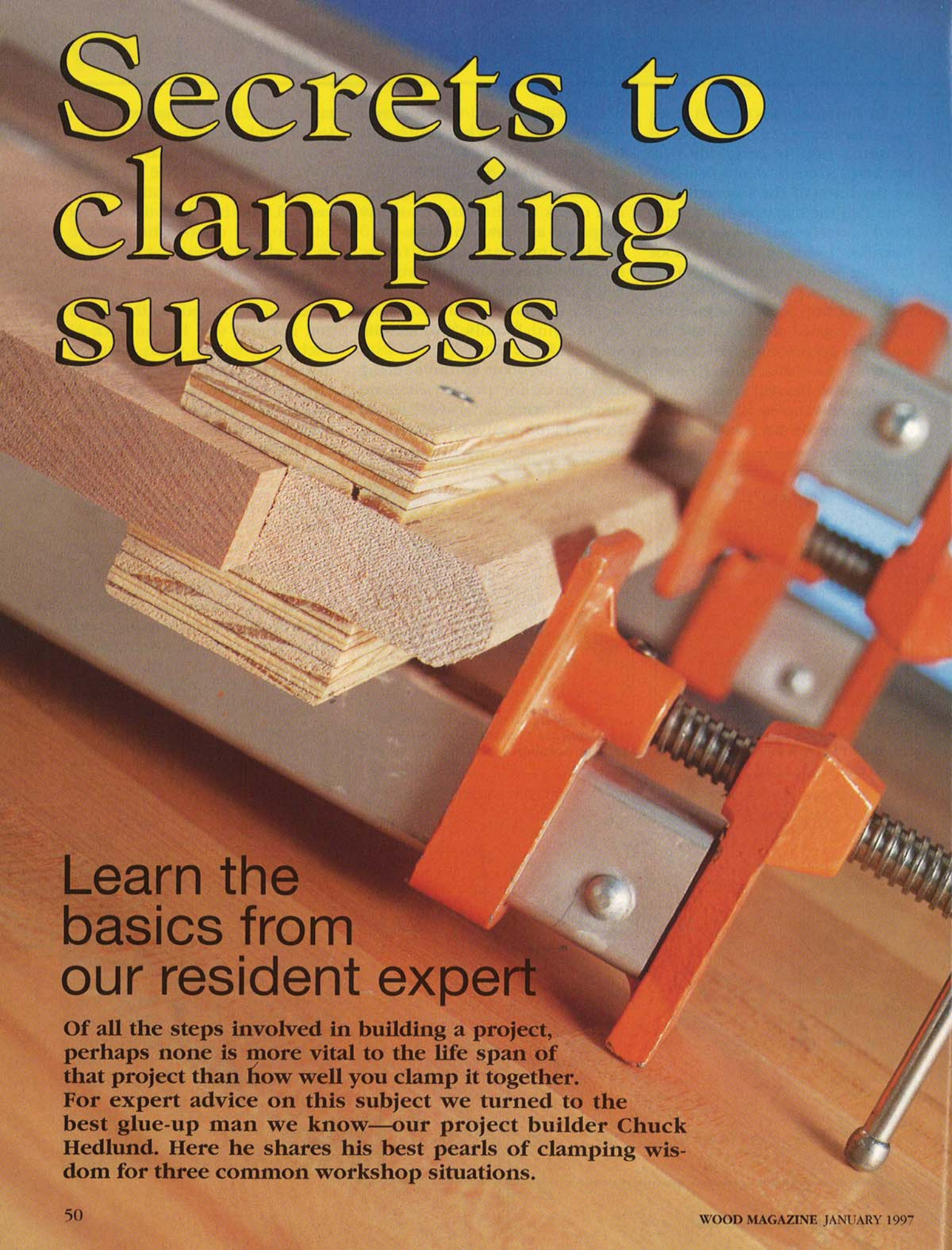
1 Remove the hardware and mask the magnetic catches. Finish-sand the doors and cabinet.
2 Stain as desired (we used Penofin Applachian Oak), and apply a clear finish. Then, place the punched-tin panels in the door frames and nail the stops in place. Nail the ¼" oak plywood back panel (H) in place.
3 Reattach the doors to the carcase. Hang the cabinet, and place a stained and finished ⅜" wood button over each screw used to hang the cabinet.

How about a matching pie safe?

Our pine pie safe from the August 1992 issue of *WOOD* magazine was such a success, we updated it and put together a *WOOD PLAN*® for you to build the project. Order Pie Safe, IFS-1012, for $9.95 ppd. from *WOOD* Magazine Plans, P.O. Box 9255-Dept WD-88, Des Moines, IA 50306. Or call 800/572-9350 to order.

Written by Marlen Kemmet
Project Design: James Downing
Illustrations: Kim Downing; Lorna Johnson
Photographs: John Hetherington

Secrets to clamping success



Learn the basics from our resident expert

Of all the steps involved in building a project, perhaps none is more vital to the life span of that project than how well you clamp it together. For expert advice on this subject we turned to the best glue-up man we know—our project builder Chuck Hedlund. Here he shares his best pearls of clamping wisdom for three common workshop situations.

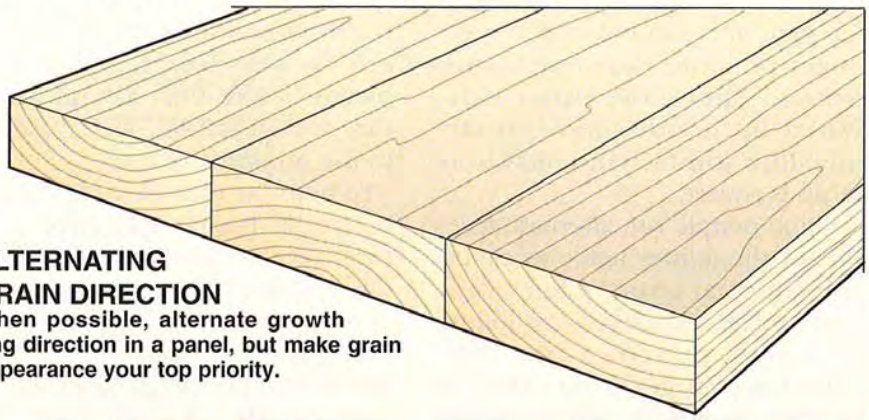
SITUATION 1: EDGE-JOIN A PANEL STEP-BY-STEP

Edge-gluing lumber into wide panels doesn't have to be a daunting task. With the help of our clever fixture and step-by-step advice, you'll be able to produce top-notch results every time.

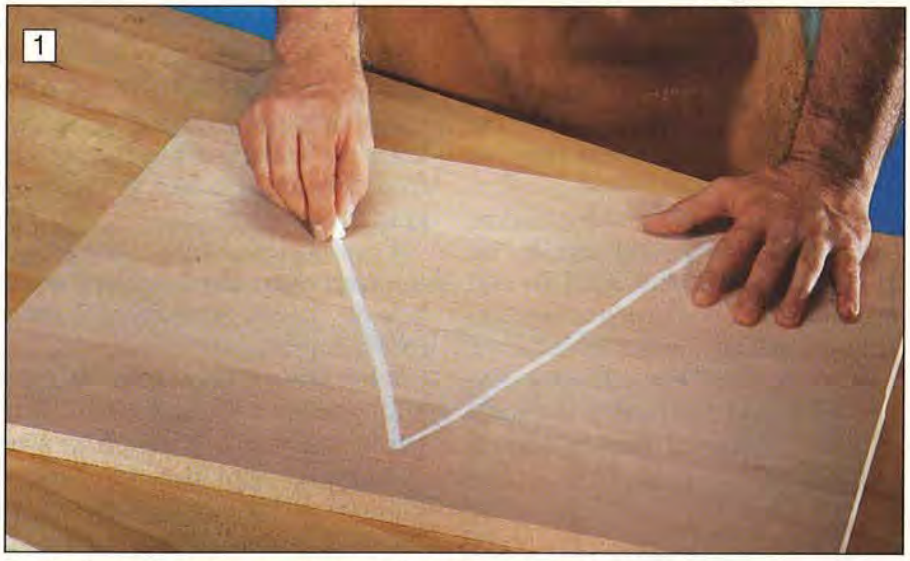
First, keep in mind that all successful clamping operations begin with careful planning. That includes buying your lumber in advance to let it acclimate to the temperature and humidity of your workshop. "You can never be sure of how the lumber was stored before you bought it," Chuck says, "but you can bet that it wasn't in conditions that match those in your shop. I always like to give lumber at least 72 hours in my shop before I start cutting."

Chuck then cuts the boards for the panel to uniform length. "At this point, I size the blank so it will be at least one inch longer and wider than the finished dimensions of the panel," he says. "That makes it easy to trim to final size later."

Next, put the boards on the workbench and shuffle them until you get the best-looking arrangement of color and grain pattern. Alternating the direction of the growth rings as shown in the illustration *top* is a good general rule to help keep the glue-up from bowing with seasonal changes in humidity. But, Chuck sometimes makes exceptions. "I pay attention to the growth rings if the wood has a bland figure, but most of the time I consider appearance first," he confesses.



ALTERNATING GRAIN DIRECTION
When possible, alternate growth ring direction in a panel, but make grain appearance your top priority.



Study the grain pattern and color of the boards, then choose the most appealing arrangement. Mark a bold V for easy realignment later.

Next, mark the face of the boards with a large V in white chalk as shown in *photo 1*. This helps you easily get the boards back in the same order after you apply glue. For light-colored woods, mark with a pencil. Either way, the marks will disappear when you sand the finished panel.

Before jointing the edges of your workpieces, it pays to check the accuracy of your jointer. To do this, mark the face of two scrap-wood boards, then joint their edges (with the face marks away from the jointer's fence for each pass). Then, place the jointed edges next to each other on a known flat surface, such as your saw table as shown in *photo 2*. If

Use your saw table as a flat reference to check jointed edges. There should be no gap. Turn boards over, and repeat.

Continued

the joint line disappears with only finger pressure, turn the boards over to check the other side. When both sides have nearly invisible joints, your machine setup is square.

"Some people run alternate faces against the jointer fence to cancel any potential error," Chuck says, "but I prefer to adjust the jointer for a perfectly square cut." Take your time to get joints that fit together well with only minimum hand pressure. "Brute clamping force is no substitute for careful workmanship," Chuck explains. Joint the edges of your workpieces, then realign them on your workbench.

If the panel will be subjected to pressures that could strain the glue joints, you may want to add mechanical reinforcement. Splines, biscuits, and dowels serve two purposes: They add glue surface and help keep the joint aligned during clamping. Just make sure the reinforcements fit properly by dry-clamping the workpieces before final assembly. For this demonstration, we chose not to use reinforcements.

To help the clamping go smoothly, we devised an edge-gluing fixture (see the drawing *below*) that directs clamping pressure to the center of the workpieces. If the clamping pressure is not centered, it can result in "overpull" or "underpull," which cups the panel. You'll need two of these handy fixtures, one for each clamp-bearing edge. As an additional advantage, this fixture elevates the clamps off the panel surface, making it easier to clean up glue squeeze-out.

We also made some 3" lengths of the fixture to align the individual boards. You'll need two of these for each joint.

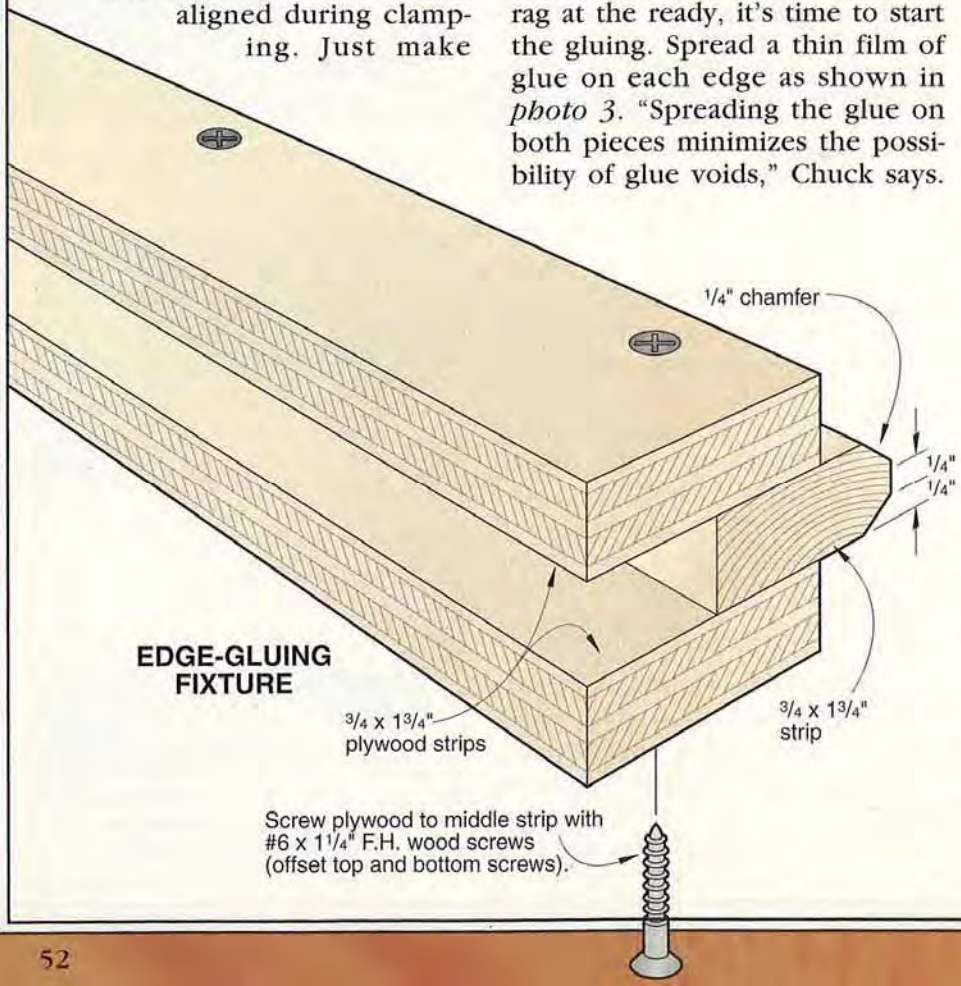
With your workpieces, clamps, and bucket of water with clean rag at the ready, it's time to start the gluing. Spread a thin film of glue on each edge as shown in *photo 3*. "Spreading the glue on both pieces minimizes the possibility of glue voids," Chuck says.

Strip the foam off a used foam brush, and you'll have a firm plastic glue spreader with a handle.

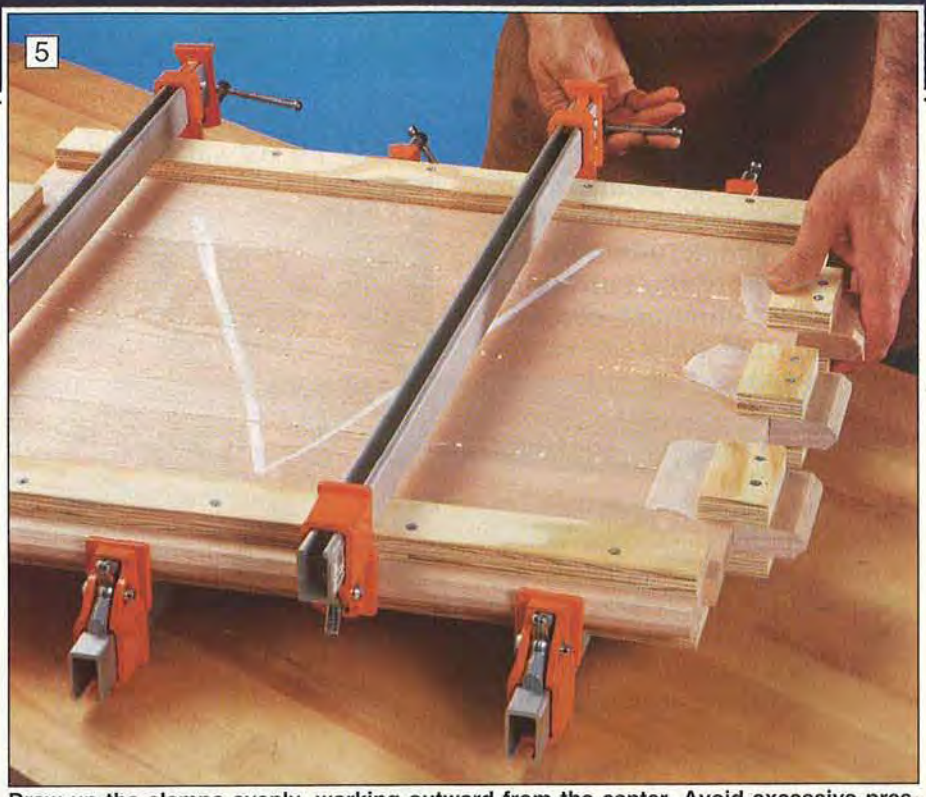
Make sure you have covered each edge with a thin film, but don't overdo it—the ideal joint line is only as thick as a few glue molecules. Excess glue will simply make a mess.

Rub the edges of the boards together as shown in *photo 4*. Then, use the 3" sections of the edge-gluing fixture to hold the boards in position while you put the assembly into the clamps. Be sure to place waxed paper in these short fixtures so they don't stick to the panel.

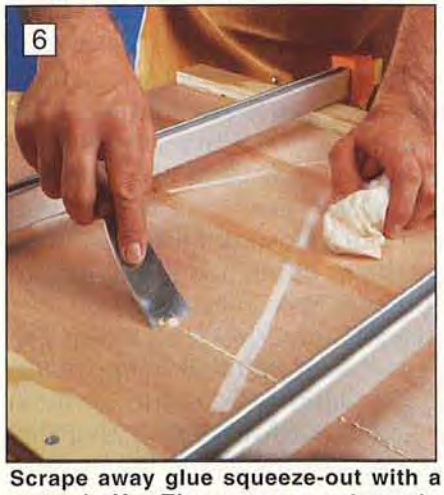
Put the clamps into position as shown in *photo 5*. Note that the clamps alternate on top and bottom of the assembly to equalize the pressure and help prevent bowing. Tighten the center clamp first until the boards all touch each other and you see a slight bead of glue squeeze-out at the joints. Then, tighten the clamps on each side of the center one, and continue working out to the ends of the boards. Check all the clamps in sequence again, making


1/4" chamfer
1/4"
1/4"
EDGE-GLUING FIXTURE
3/4 x 1 3/4" plywood strips
3/4 x 1 3/4" strip
Screw plywood to middle strip with #6 x 1 1/4" F.H. wood screws (offset top and bottom screws).

Rubbing the glued edges together gives the glue a chance to "grab," making assembly easier.



Draw up the clamps evenly, working outward from the center. Avoid excessive pressure; overtightening the clamps weakens the glue joint and may bow the panel.



Scrape away glue squeeze-out with a putty knife. Then, use a wet rag to remove all traces of the glue.

Use a framing square or other straightedge to check the panel for flatness.

sure that the pressure is even along the length of the glue joints.

"Most people overtighten their clamps," Chuck says, "but you need to remember that this is not a strength contest. You only need to bring the boards in firm contact with each other. The glue will take it from there." Overtightening the clamps can bow the panel and also lead to weak, glue-starved joints.

Next, remove the short clamping fixtures and scrape the glue squeeze-out off the panel with a putty knife as shown in *photo 6*. Follow up with a damp rag. "You need to use enough water in the rag to float the glue out of the wood's pores," Chuck explains. "One pass of the rag won't do it. Refold and rinse the rag often so you don't spread the glue."

Check the assembly for flatness with a straightedge as shown in *photo 7*. "Once you have everything tweaked into position, leave it alone for at least one hour," Chuck says. "If you move it, something will almost certainly move out of adjustment." After gently removing the clamps, place the panel so there is no strain on the joints, and so air can circulate freely around it. Don't try to rush things by putting the panel in the sun—that's an open invitation to warping. When using yellow woodworker's glue, wait at least three more hours before machining the panel. With white glue, allow overnight drying.

Continued

SITUATION 2: HOW TO CUT AND CLAMP A MITERED FRAME

Another typical woodworking clamp-up is a mitered assembly such as a simple picture frame. You can apply the cutting and clamping techniques described here to other projects, such as mitered boxes. The only significant difference is that in box construction you use two or more band clamps.

Mitered frames require eight cuts, and any inaccuracy quickly multiplies into an unsightly gap. That's why accurate cutting is the key to your success. "A mitered frame looks deceptively simple, but several things can go wrong," Chuck cautions. "With a little patience, you can cut miters with deadly accuracy."

To ensure success, Chuck uses a simple homemade tablesaw miter jig to cut the miters as shown in *photo 8* (see "10 Quick-and-Easy Scrap-wood Jigs" in the December 1995 issue, page 52, for jig plans). Make test cuts in scrapwood until you get the angle right. Chuck offers this advice: "If the corners of your test frame do not close up neatly, make an adjustment to only one of the miter fences if the error is less than 1° or 2°. Then, recut just one miter on each piece: all right- or left-hand cuts. This is half the work of adjusting both cuts, and the slight difference in the length of the miter won't show."

Make the first cut on each workpiece as shown. Then, clamp a stopblock to the jig to ensure that workpieces are the same length.

Use only enough pressure to snug up the frame parts. Excessive tightening can damage the corners.

Dry-clamp the frame pieces, using a band clamp with metal or plastic corners as shown *left*. Gather the other items you will need: glue, rags, water bucket, and putty knife.

Spread a thin film of glue on each of the miters. Assemble the frame on a flat surface and carefully check it for flatness as you tighten the clamp. If you need to adjust the pieces, back off the pressure rather than trying to move the parts under tension. Avoid excessive pressure, which can crush the outer corners of the frame. Follow the glue-removal and drying instructions as described in the final two paragraphs of the previous section.

SITUATION 3: CLAMP A LARGE BOX WITH CONFIDENCE

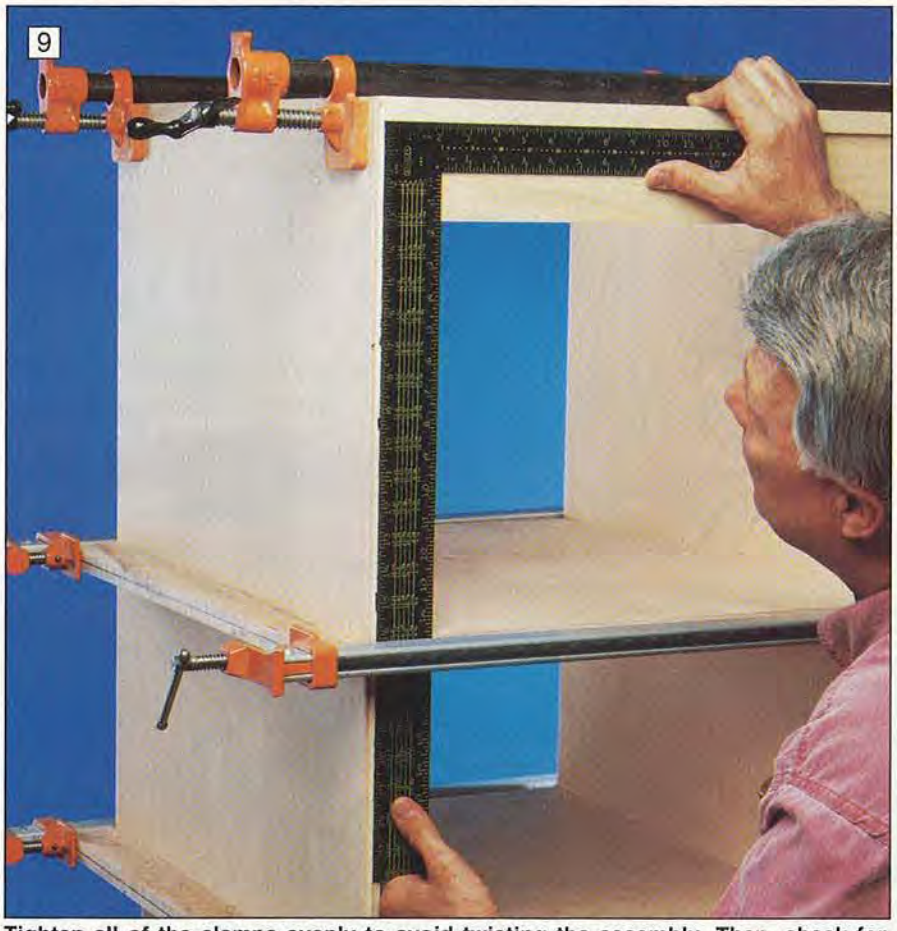
To demonstrate the techniques involved in carcase clamping, Chuck assembled a typical base cabinet. (This cabinet will later get a face frame, but our demonstration will not include that step.) You can adapt many of the techniques you see here for clamping boxes of all sizes: jewelry boxes, wall cabinets, and drawers, for example.

When you build a plywood cabinet, be certain to gauge the width of the rabbets and dadoes from the actual thickness of the stock, not its "nominal" or advertised size. Strive for dadoes that let you assemble the cabinet without hammering on the plywood.

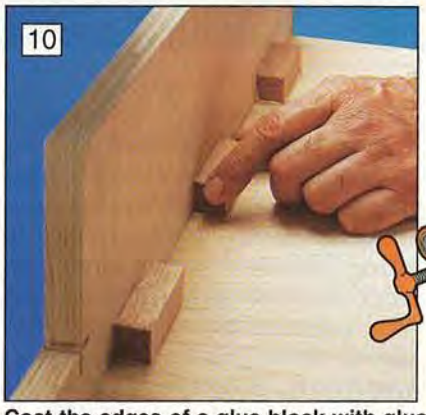
Dry-clamp the assembly to check the fit of all the pieces, and to prepare your clamps. Make a pair of clamping cauls as shown in the drawing *bottom* for each fixed shelf in the cabinet. These cauls will help distribute clamping pressure evenly over the length of the dadoes holding these shelves.

Apply glue to mating surfaces and clamp up the assembly as shown in *photo 9*. Check for square with a framing square, and double-check by measuring diagonally in both directions across the front of the carcase. If the diagonals aren't equal, place a clamp on the corners of the longer diagonal and apply pressure to equalize the diagonals. Leave all clamps in place for at least one hour, then unclamp. Install the back immediately to avoid straining the joints.

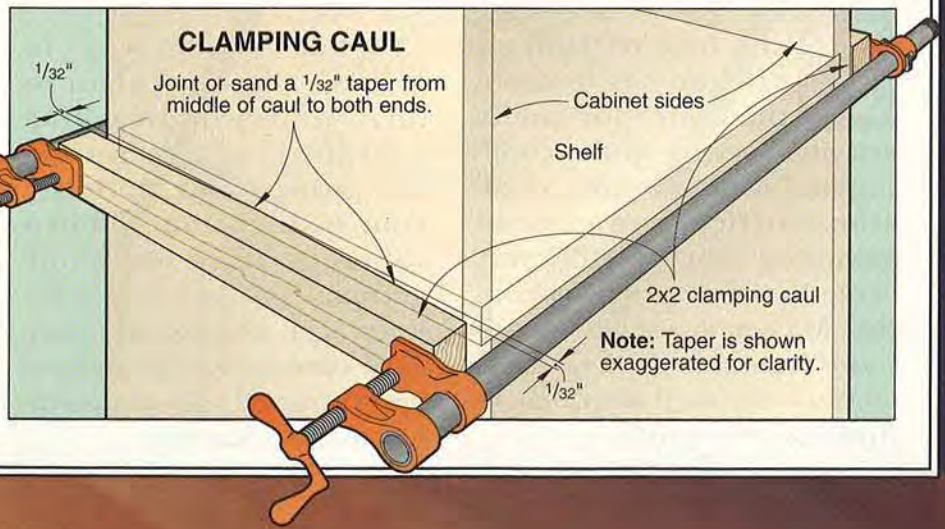
You can reinforce the joints with glue blocks positioned inconspicuously as shown in *photo 10*. These blocks are easy to make, install quickly, and add strength to the cabinet's joints.



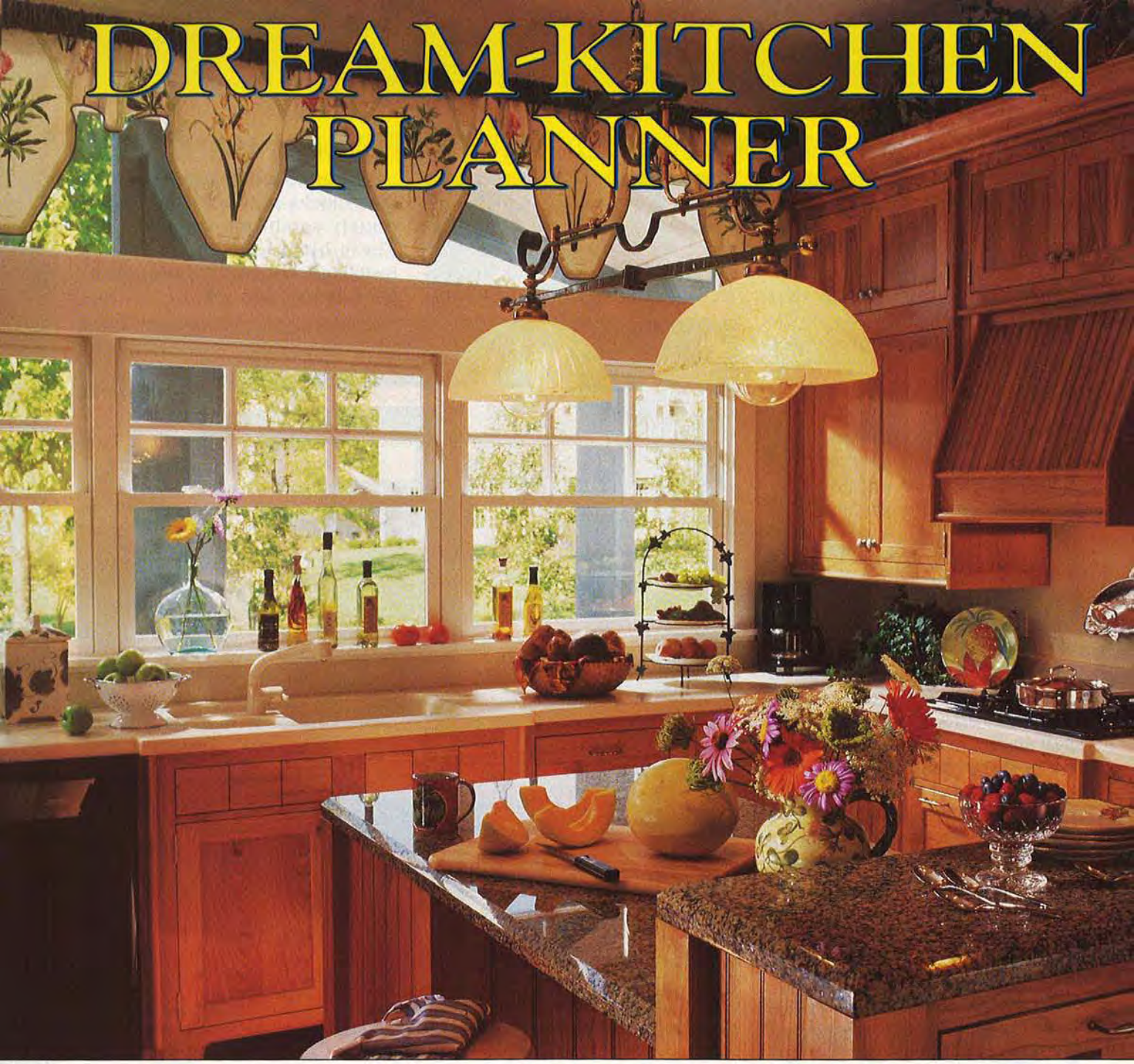
Tighten all of the clamps evenly to avoid twisting the assembly. Then, check for square with a framing square and by measuring diagonally in both directions.



Coat the edges of a glue block with glue and rub it back and forth until the glue grabs. No clamping is necessary.



DREAM-KITCHEN PLANNER



Let's face it. Today's kitchen has become the center for family activity, serving as the cooking and dining center, occasional office, and general gathering spot. To efficiently serve in these various capacities, kitchen space and its primary fixtures — the cabinets — must be well planned to optimize every inch.

What better way to achieve that goal than to turn your woodworking energies to planning, designing, and building your own custom kitchen cabinets. Here are some general planning guidelines, tips, and specific standard dimensions to guarantee winning looks and comfortable work areas.

Why build your own kitchen cabinets?

Building your own cabinets allows you to tailor the cabinet units to fit your particular space without using the filler strips sometimes necessary with stock cabinets. You can build in any options—either functional or aesthetic—you want. You also choose the materials, style, and finish to fit your home's decor and character.

Substantial cost savings also make building your own cabinets

With our guidelines, you can build in the features you've always wanted

an attractive alternative. Using ¾" oak plywood for the cases and solid oak for the face frames, doors, and drawer members, the materials for an 8' run of base cabinets with two 30" wall cabinets would cost roughly $600.

For the same cabinet layout, high-end stock cabinets using comparable materials and construction would cost roughly $2,500. Even the most basic cabinets for this layout—constructed primarily of particleboard—would cost about $700. So for the investment of your labor, you get higher quality and custom features you may not otherwise be able to afford.

The extent of your kitchen project depends on your needs, your budget, and the time you want to invest. To get the features you need, you may want to start from scratch or rework the existing space by adding your own customized cabinets.

Inconvenience also accompanies any kitchen construction project, but you can minimize the downtime by constructing all the cabinets as units in your shop ahead of the actual installation.

Plan your kitchen with family needs in mind

The overall configuration of your kitchen should be determined by your family's size and how you use the space. If you're starting from scratch with an empty room, use this rule of thumb to calculate the number of cabinets you'll need: Basic storage requires 9' of base and wall cabinets, plus 3' of cabinets for each member of the family regularly eating at home. An average family of four requires 21 running feet of both wall and base cabinets.

To accommodate multiple cooks, allow plenty of room to move around—at least 48" between counters—so users can share the space comfortably. Dining and office space may also be incorporated, but should be located out of the main traffic lanes to avoid congestion.

Minimize footsteps for maximum efficiency

Classic kitchen design centers on a work triangle with the sink, stove, and refrigerator located at the three points, as shown *below*. The total length of the three legs should be less than 26' for maximum efficiency.

Newer, larger kitchens incorporate work centers designed for multiple cooks and/or specific tasks. Usually incorporating an island, work center kitchens have a primary work triangle which shares its "points," such as the refrigerator and sink, with secondary work triangles. Since each

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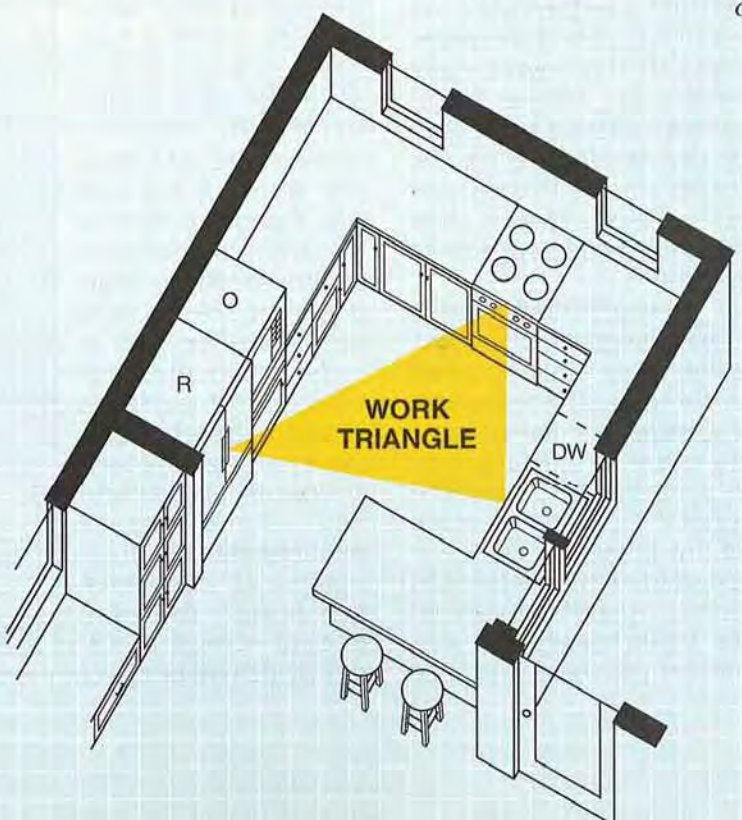
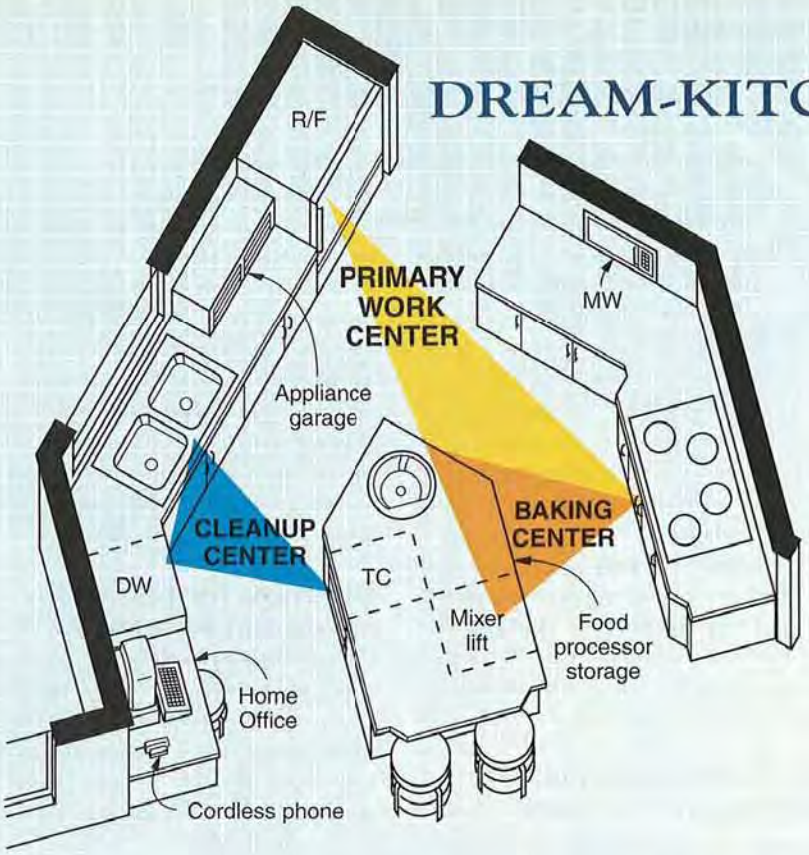


DREAM-KITCHEN PLANNER



area has its own flow pattern, as illustrated *above*, cross traffic seldom occurs.

Consider customized counter heights

While 36" continues to be the standard countertop height, many designers are tailoring workspaces to individual cooks based on elbow height. To determine elbow height, have your cook stand up straight, arms at his or her sides, with elbows bent, then measure the distance from the floor to the elbow. Placing the countertop 2-3" lower than elbow height provides optimum working comfort.

For the physically disabled person who must cook from a wheelchair, countertops should be only 31" from the floor. To accommodate the chair under the countertop, you must provide a free space 30" wide by 29½" high. This allows a full 24" of forward reach on top of the counter.

The type of food preparation can also determine counter height. If you bake fresh breads and pastries, consider placing a 3' section of countertop 5" below elbow height (roughly 29-30" above the floor) so you can bear down when rolling out dough.

Dining dimensions, home office specifications

Dining counters range from the informal high bar to casual family seating at table height. Bar-height counters measure 42-45" from the floor. A bar can also extend from your 36"-high counterspace or drop down to table-height at 28-32" from the floor. The box, *at right*, shows the some of the most common counter heights and the appropriate corresponding seat height and knee space requirements.

Allow 21" of countertop length for each person served. A 15" depth provides space for a single place setting. Two diners facing each other at a table or booth need a minimum combined width of 30".

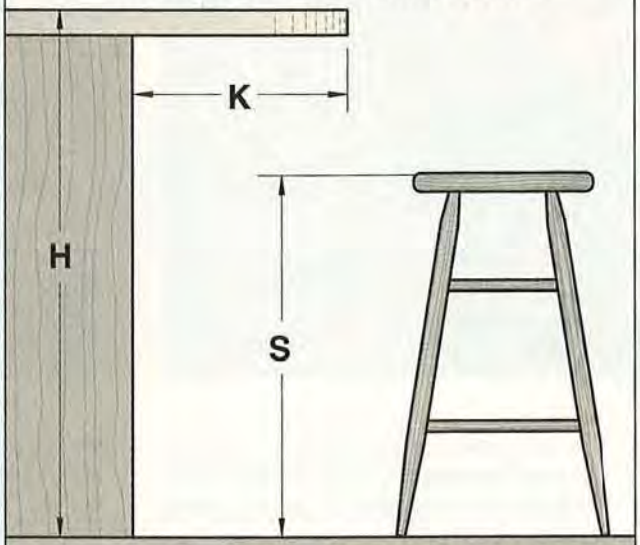
If you include a home office, allow 3-4' of table-height counter with some drawer space underneath, adequate lighting, and a telephone. You may even want to add space for a computer.

Make room for all those appliances

Your kitchen appliances also affect the dimensions of many of your cabinets and countertop area. Luckily, appliance manufacturers heed standards, too. That's why a built-in dishwasher fits snugly under a countertop and a drop-in range lowers in with room to spare.

In the chart at *right*, you'll find a listing of appliance dimensions, as well as those for single-, double-, and triple-bowl sinks. Use these as a planning guide for counter-

GET THE DINING HEIGHT RIGHT



H = Dining counter height
K = Knee space
S = Seat height

	H	K	S
Table Height	28–32"	18"	18"
Counter Height	36"	10"	24"
Bar Height	42–45"	7–9"	30"

APPLIANCE AND SINK DIMENSIONS

Unless you buy commercial or European units, almost all appliances fall within the following range of dimensions. Refer to them when planning your cabinets, but get actual measurements before you build.

APPLIANCE	HEIGHT	WIDTH	DEPTH
Range, floor model	35 1/8–36"	19 1/2–40"	24 1/2–26 1/4"
Range, w/eye-level oven	61 1/2–67 7/16"	29 7/8–40"	25 1/2–27 5/8"
Range, drop-in	23–23 1/2"	22 7/8–23 7/8"	22 1/8–25"
Cooktop	2–3"	12–48"	18–22"
Wall oven, single	23 1/2–25"	21–24"	21 1/8–22 11/16"
Wall oven, double	39 1/4–50 3/8"	21–24"	21 1/8–22 11/16"
Wall oven, w/broiler	38–40 3/16"	21–24"	21 1/8–22 11/16"
Range hood	5 1/2–7 1/2"	24–72"	12–27 1/2"
Microwave	13 5/8–18"	21 1/2–22 1/2"	14 1/2–22"
Refrigerator	55 1/2–68 7/8"	24–35 1/2"	24–32 7/8"
Dishwasher	33 1/2–34 1/2"	23–24 1/4"	23 11/16–26 1/4"
Trash compactor	33 1/2–34 1/2"	11 7/8–14 7/8"	18–24 3/16"

SINK	LENGTH	WIDTH
Single bowl	11 1/2–33"	13–22 3/8"
Double bowl	28–46"	16–25"
Triple bowl	43–54"	22"

top cutouts and spacing between base cabinets, but always refer to the specific sink or appliance model you'll use for exact installation instructions.

Your appliances and sink also require a certain amount of countertop space for loading and unloading. While your space may require adjusting to these ideal situations, here are some general considerations to keep in mind:

- Ranges, including built-in or countertop microwaves, should have about 18" of work area on either side; ovens, about 15" on one side.
- To load or unload a refrigerator, allow approximately 18" of counter on the door-opening side.
- Try to provide space on both sides of the sink for cleanup — 30" to the right and 24" to the left.

Some manufacturers now make refrigerators that are base cabinet depth (24") and that will accept front panels to match cabinetry doors, as seen in the opening photograph. This allows large appliances to blend seamlessly into the kitchen landscape.

Lots of small, laborsaving appliances, such as food processors, might require their own storage areas that you'll have to custom-dimension. A 30"-deep countertop can help provide the necessary work and storage space.

Dimensional standards to keep in mind

While custom features and your appliance dimensions will dictate many layout decisions, you'll still want to keep in mind cabinet dimension standards. These standards, developed decades ago, were based on the physical attributes of the average woman, the primary kitchen user of that era. Countertops are most often 36" high because that was determined to be the most efficient and comfortable working height.

Ergonomic research indicated that most women have a comfortable overhead reach of 68", the height at which you'll find the highest regularly used shelf in a wall-hung cabinet. That's also why the more frequently used upper drawers in a base cabinet are about 28" from the floor so they can be opened without bending down.

Reach radius—the distance the average woman can stretch her arms straight out in front of her—determined not only the depth of a countertop, but the depths of cabinets, too. Reach radius, plus the amount of space needed for cooking, baking, and cleanup, also established the distance between wall cabinets and countertops, the clearance over ranges, and space needed around ovens, sinks, and dishwashers.

Wall cabinets: sized for versatility

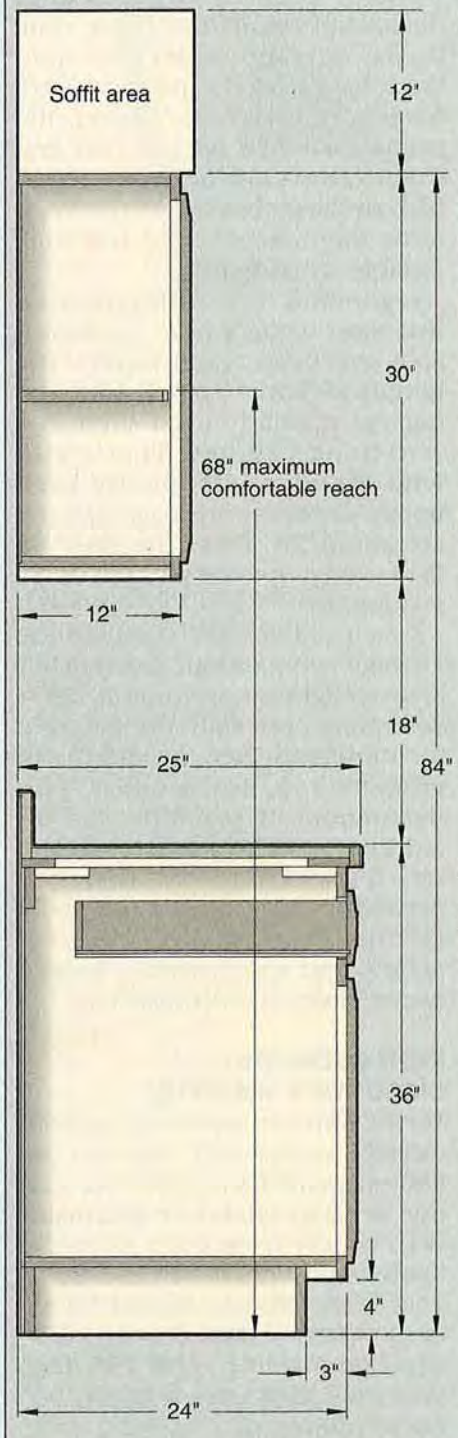
Wall cabinets normally mount directly on the wall, but you can also suspend them from the ceiling over an island or peninsula with access from both sides. No matter how much you use them, your wall cabinets should be 12" deep when installed over a 25"-deep countertop, and 15" deep when installed over a wider, 30"-deep countertop.

Continued

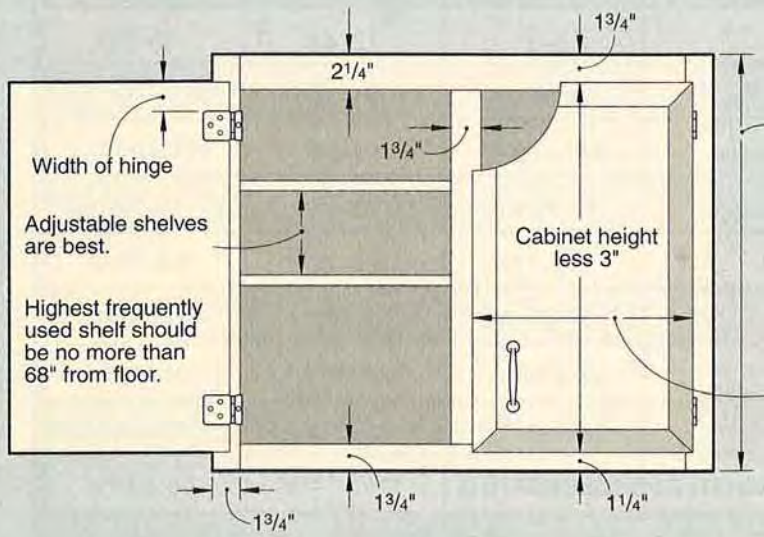
DREAM-KITCHEN PLANNER

How tall you make wall cabinets depends on how much storage you need. With a closed or open soffit, the standard wall cabinet height is 30", providing two shelves for three compartments. If you want to maximize storage, utilize the 12" soffit space by installing 42" full-height cabinets.

The width of wall cabinets, usually 9–36", is determined by the width of the matching base cabinets below, since in most cases, the units are viewed as a pair. Whether a wall or base cabinet has one door or two, however, depends on its width. Doors wider than their height tend to sag because of the weight on the hinges. That's why wide cabinets usually have two doors.



Wall Cabinets



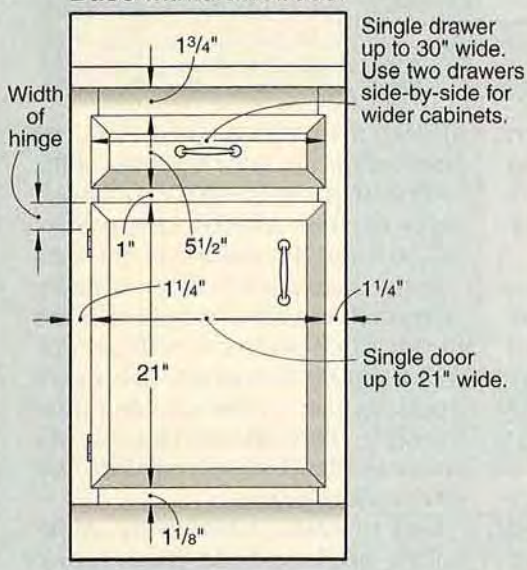
Closed or open soffits
30" for typical cabinet
15–18" above refrigerator
18" above range

Full-height cabinets
42" for typical cabinet
24–30" above refrigerator
30" above range
12" above windows

Door widths should be no wider than the door is high.

Note: Overlay doors and drawers shown. Door and drawer fronts overlap frame openings 1/2" on all sides (3/8" also common).

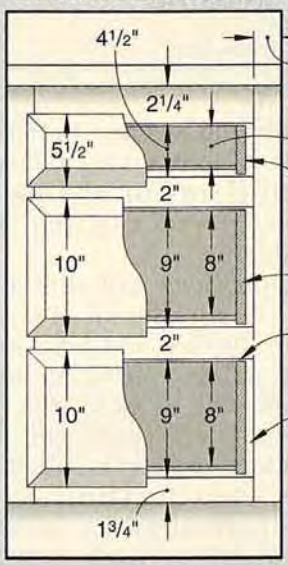
Base with drawer/door



Single drawer up to 30" wide. Use two drawers side-by-side for wider cabinets.

Single door up to 21" wide.

Base with all drawers



½ x 4¼" drawer side

½ x 8¾" drawer side

⅛" space top and bottom

Space ½" on both sides when side-mounted guides are used. Without guides, ⅛" space.

Base cabinets for big-time storage

You may want a special narrow cabinet 9" wide to stand cookie sheets and trays on edge next to the stove, or an under-sink cabinet 42" wide. However, base cabinets normally measure 24" deep and 34½" high (adding a 1½"-thick countertop brings them up to 36"). Extra-deep base cabinets of 29" maximize countertop area for tasks such as baking, or storage for small appliances. (You can also set standard-depth cabinets away from the wall and cover them with a 30" countertop.)

Divide up the space in a base cabinet with all shelves and a door or doors, all drawers or a combination of drawers and doors, as shown in the typical configurations *at left*. As with wall cabinets, the width of the cabinet determines whether you should use one drawer or door, or a matching pair.

Specialized cabinets, space-saving hardware

Pantry cabinets and broom closets often span from the floor to flush with the top of wall cabinets. Their widths and the number of compartment vary according to the size and amount of storage space needed.

Corner cabinets with lazy Susan shelves, shown *below*, provide convenient access to normally wasted space. You can purchase the rotating shelves as a unit, or buy just the individual components you need.

A variety of other storage organizers and hardware available at most home centers or through mail order catalogs let you maximize storage and ease of access. Swing-down racks hung underneath wall cabinets put spices or knives within easy reach. Baskets or entire shelving units mounted on rollers or glides provide quick access to items otherwise hidden at the back of the cabinet.

Recycling bins may also be incorporated to provide handy short-term storage for cans, paper, and glass. Consider installing removable plastic bins to provide convenient carrying containers for your trips to the recycling center. Such bins make it easier for you to scrub them out periodically.

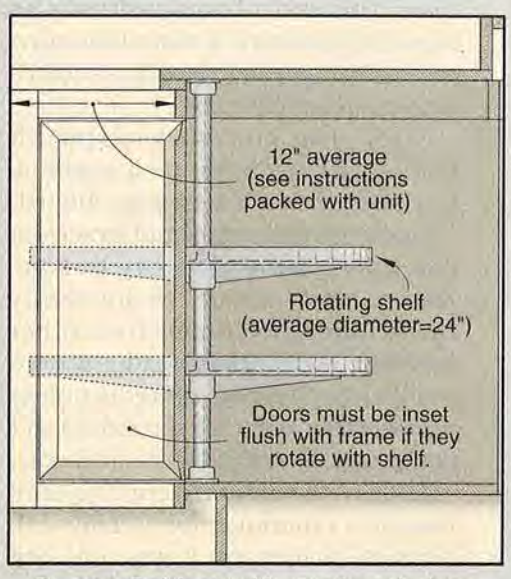
Pulling it all together

Once you've determined how you want to use the kitchen space and what custom features you'd like to include, it's time for a reality check. First, make a scale drawing of your kitchen space and make scale cutouts of various cabinets and appliances. Try arranging them in various configurations, keeping in mind the work flow.

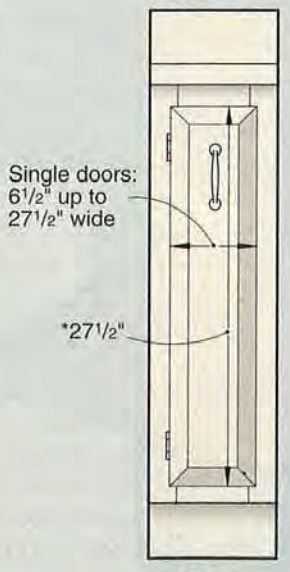
Computer drawing programs give you even more flexibility in developing these layout schemes, and a variety of kitchen planning programs are available. Some even provide elevation views and generate cost estimates.

Once you've arrived at a workable floorplan, carefully make dimensioned drawings of each cabinet unit. From these drawings, you'll determine the bill of materials necessary for the job. Detailed drawings also keep you on track when you begin constructing the many individual cabinet units.

Finally, consider the overall cost in terms of both time and money. You may want to break the job into several phases to make it more manageable.



Corner Cabinet with rotating shelves



Base
with door only

Need more information?

The following books provide details on kitchen planning and cabinet construction:

- Better Homes and Gardens® *Your Kitchen*, Meredith, 1983.
- *The Art of Kitchen Design* by Johnny Grey, Cassell, 1994.
- *Building Your Own Kitchen Cabinets* by Jere Cary, The Taunton Press, 1983.
- *Making Cabinets and Built-ins* by Sam Allen, Sterling Publishing Co., 1986.

You can also receive free kitchen planning information by contacting the National Kitchen and Bath Association at 800/401-6522.

Written by Kerry Gibson Photograph: Jim Hedrich Illustrations: Kim Downing; Carson Ode

Woodworkers To

To youngsters with physical challenges, your

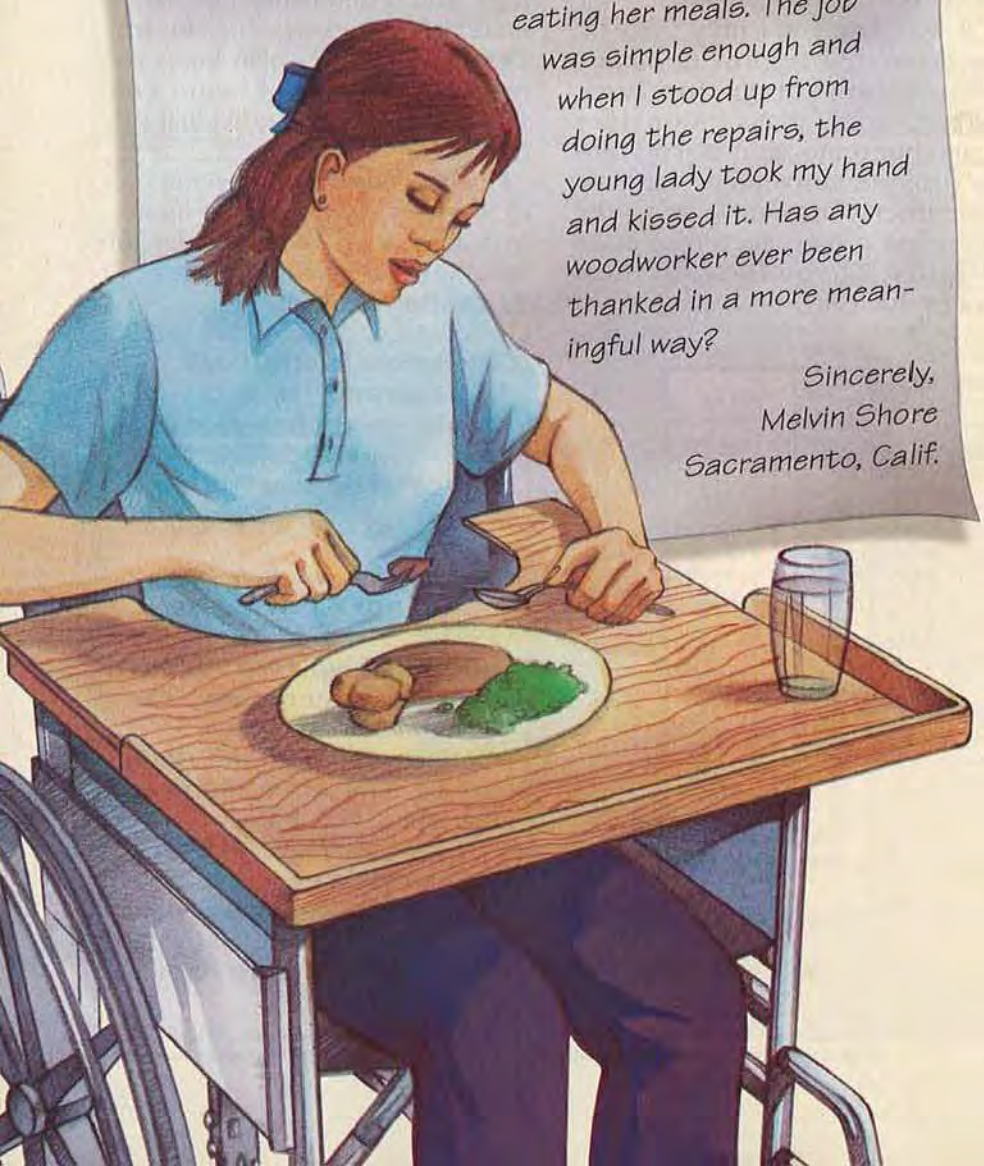
Print this article

Dear WOOD,

In a recent edition of WOOD magazine, you had an article about an opportunity to help handicapped people by building support devices. Although I am only a woodworking hobbyist, I clipped your article and sent it along to our local Easter Seal Society. There must be indeed a need. I received a call from them almost before I posted the letter.

One of the first things I was asked to do was some minor repairs to the wheelchair tray used by a young lady with cerebral palsy for eating her meals. The job was simple enough and when I stood up from doing the repairs, the young lady took my hand and kissed it. Has any woodworker ever been thanked in a more meaningful way?

Sincerely,
Melvin Shore
Sacramento, Calif.



Jim Lee works as a technician at the Rehabilitative Engineering Department of the University of Iowa's Hospital School, in Iowa City, Iowa, which specializes in ongoing treatment of children with developmental disabilities. He uses his woodworking skills to craft assistive devices such as wheelchair lapboards and floor sitters, and explains how you, too, can help.

For Jim Lee, it was a typical day in the workshop. First, he completed a wheelchair laptray he had made from oak plywood. Fitted to a young girl's wheelchair, it provided a supported base on which she could work on hand dexterity.

Next, Jim figured out how to incorporate a rocker switch into the on/off control of a powered wheelchair. An eight-year-old boy used the switch to control the direction in which the chair traveled. The joy of growing confidence lighted his eyes.

Later, Jim met with a speech pathologist to decide on a positioning device for a language board. Because of the straps and braces in her wheelchair—necessary to regulate posture—a girl in her early teens found it difficult to use her language board. Jim found a way to modify the language board's holder on the laptray. Now, she can better communicate with friends and family.

And so the hours went by, each making a difference for a child with physical challenges. It was only one day, but in it Jim put his skills as a woodworker, metalworker, upholsterer, designer, and problem solver to satisfying use.

The Rescue
skills could be a really big deal.

No one works alone

Until 1991, Jim taught high school industrial arts. Suzanne Miller, Jim's coworker, came to rehabilitation engineering from a furnituremaking background.

"I believe that what we now call rehab engineering probably evolved out of a hospital's building services department," says Suzanne. "A therapist would need a special device for a patient, and a carpenter would make one up out of what was on hand."

Today, rehab engineering technicians work closely with people with disabilities and with physicians, physical therapists, speech-and-language pathologists, and professionals from other disciplines. "For example, therapists take the patient's body measurements, then give them to us to decide on the right application of the material and hardware," Jim explains. "It's a lot like building custom furniture."

And like custom furniture, assistive devices can be expensive. Bringing skills like woodworking into the picture can help to keep costs down.

Items like standing tables, floor and corner sitters, and a variety of assistive devices are available commercially. But these items may have to be customized for each patient. They also wear out or get broken. So, fitting and making, refitting or replacing, is an ongoing process. The needs of patients keep the skill of Jim, Suzanne, and other members of the rehabilitation staff in demand.

Woodworking can help

The photograph *opposite* depicts a typical shopbuilt item made by Jim and Suzanne. "When you have a basic pattern, you can adapt and customize from that," advises Jim. "Woodworkers everywhere could do this, and help out in their communities. The key thing is to join up with a qualified therapist."

Suzanne agrees: "If we can get woodworkers teamed up with professionals in their communities, patients with disabilities wouldn't have to travel to a facility like this for specially made devices. And there's a lot of satisfaction. When I was making furniture, I'd spend a week on a piece to please a customer. Now, I get satisfaction every day."

Physical therapist Joy Krull and technician Jim Lee adjust Spenser Harris' wheelchair headrest for better upper body support while his mother, Toni, looks on.

Written by Peter J. Stephano
Photographs: University of Iowa Hospitals and Clinics/Warren Paris; Hetherington Studios
Illustration: Brian Jensen

Put your skills to work

Designing postural support systems or selecting complex assistive devices to be used by a person with disabilities requires training in the disability field. But as a woodworker, you have skills that could be applied to produce accessories such as the wheelchair laptray shown.

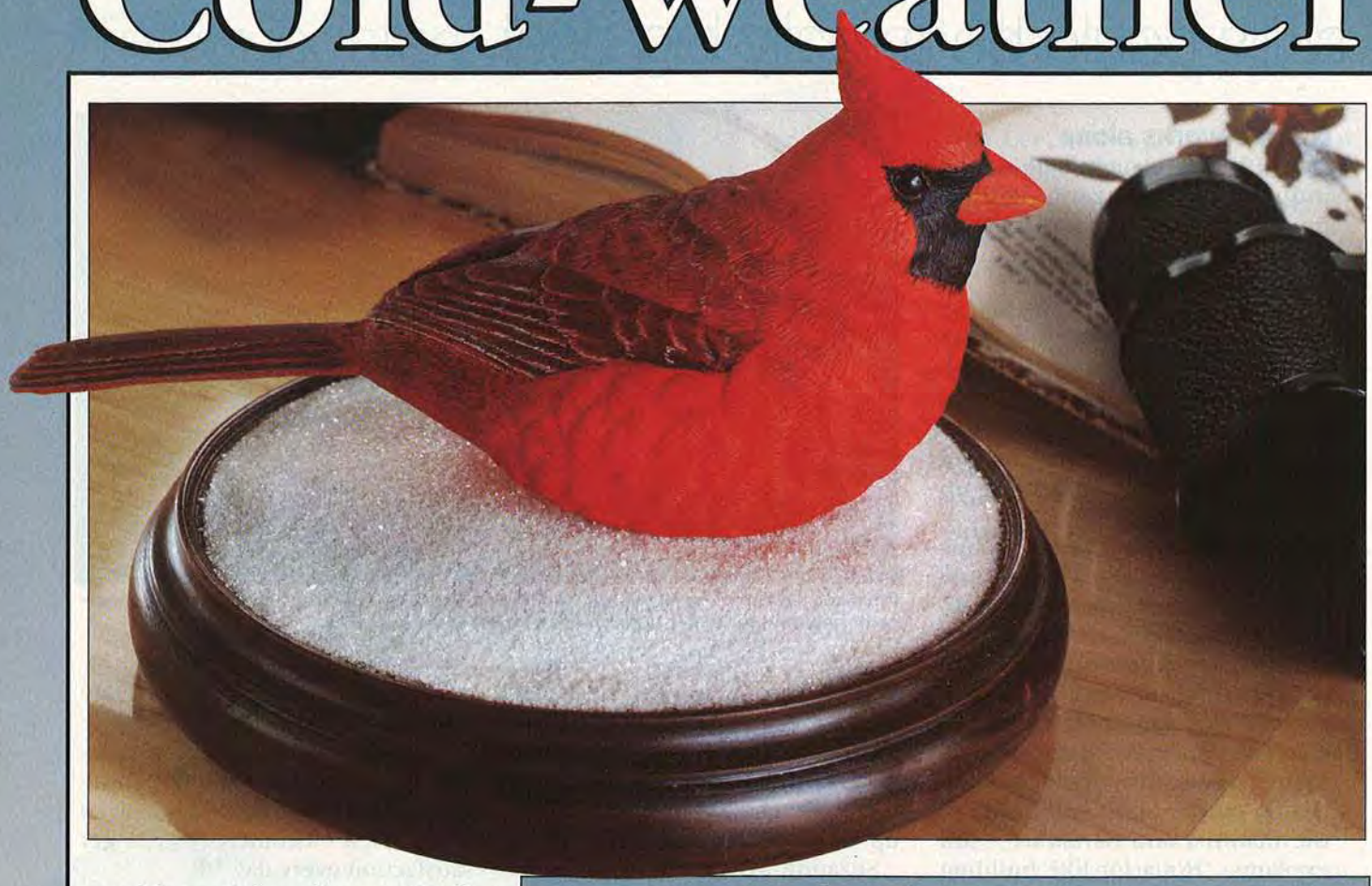
The first step to offer your services should be to talk to local physicians or physical and occupational therapists in your community. Also check with your local Easter Seal Society, county offices of state departments of social services, vocational rehabilitation services, and health services. It is most important to work closely with a health-care professional, as the requirements of each disabled person differ. What is indeed a real benefit for one might be a bad choice for another.

For more information on the field of rehabilitation engineering, write:

The Rehabilitation Engineering Society of America
1700 N. Moore St., Suite 1540
Arlington, VA 22209-1903

Carve a real snowbird

Cold-Weather



Catching sight of a cardinal, all puffed up and sitting on the snow, certainly brightens a dreary winter's day. Spending some enjoyable hours carving this beauty can have the same effect.

Bandsaw the blank

Photocopy the Full-Sized top and side views (they're in the *WOOD PATTERNS*® insert in the middle of the magazine). Adhere them to the top and side faces of a 3¾×3¼x8" piece of carving stock, as shown in the Bandsawing the Blank drawing. Bring the tip of the beak right up to the end of the block on both views.

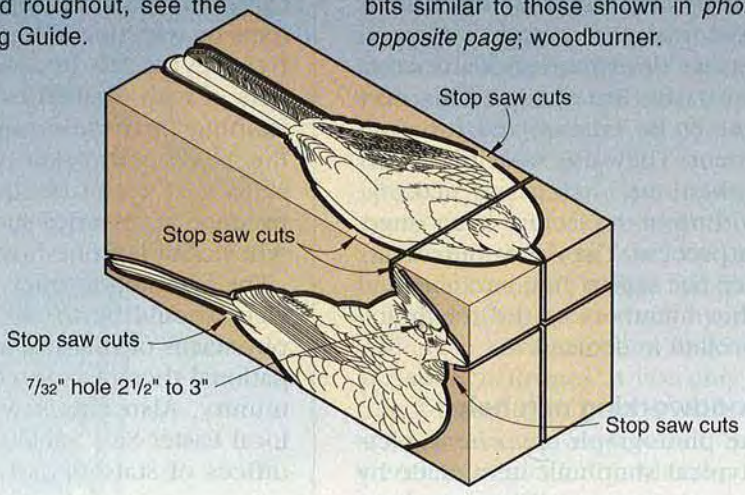
Chuck a 7/32" bit in your drill press, and drill about 2½" deep at the center of the eye location.

Project Prep

Stock: Carve the cardinal from a 3¾×3¼×8" block of basswood, jelutong, or other carving wood. If you prefer to start with a machine-carved roughout, see the Buying Guide.

To turn a base like the one shown, you'll need 1⅛×7¼×7¼" hardwood.

Tools: Power-carving rotary tool, flexible shaft or handheld; carving and detailing bits similar to those shown in *photo A, opposite page*; woodburner.



Print this article

Cardinal

Center a ¼" hole ½" deep on the bottom of the block where shown by the side view.

Bandsaw along the outside line of the top view. Start at the beak, and saw in to the stop point on each side, shown in the drawing. Then, saw along each side from the tail, again stopping where indicated. Randy Hansen, the Des Moines, Iowa, woodcarver who designed and carved the cardinal for us, stops the cuts this way to keep the waste attached, eliminating the separate step of taping the block back together to cut out the side view.

Bandsaw the outside line of the side view. Stop the cuts where shown to keep the block from coming apart. Remove the waste pieces by completing the cuts with a handsaw or simply breaking them off. Draw a centerline along the top of the blank.

Cut off the corners

Tilt the bandsaw table to 30°, and saw the corners off the blank. Cut the bottom corners to a line about ½" above the bottom edge of the blank. (To draw a guideline on each side, shown as a broken line on the pattern, we laid a pencil on a piece of ⅜"-thick scrapwood, which placed the point ½" above the benchtop, then traced around the blank.)

For guidelines to saw the top corners, draw a line on each side that starts where the tail joins the body, runs roughly parallel to the top edge of the blank about ⅞" below it, then arcs up across the middle of the eye hole. This line is also shown as a broken line on the side view. After sawing, your blank should look approximately like the one in front of the block in *photo B*.

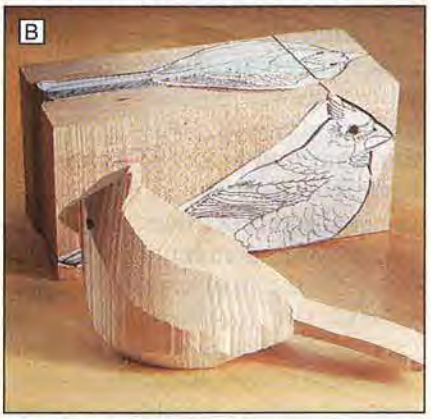
Carve some curves

Now, shape the bird. You need to eliminate flat planes (except the bottom) and sharp corners before you begin to establish the feather groups for carving. "I've depicted the cardinal in wintertime, all puffed up," Randy comments. This means you'll want the body to look plump.

With a coarse rotary cutter such as a Kutzall or a coarse bur, grind away the angles left by sawing, as shown in *photo C*. Round the planes and blend them into each other. Slope the upper corners down to avoid blockiness. Maintain the steps along the middle of the bird's back (the top of the blank); they'll guide you when you lay out feather groups later.

Refer to the front view and the various photos as you carve the bird's head. (It also helps to gather other photos and accurate illustrations of cardinals for carving references.) Start carving with a groove around the head, beginning beside the beak and running across the eye holes. The width across the back of the eye holes should be about ⅞", only slightly less—perhaps 13⁄16"—at the front of the holes. Take measurements like these easily with vernier calipers, as shown in *photo D*.

Continued


B

C

D

A

Cardinal

Above the groove, round the corners and shape the crest at the back of the head to a point. Keep an eye on the centerline as you work to keep the carving approximately symmetrical. Below the groove, round the back of the head and neck and the front below the beak. You want to achieve the effect of a roll or hump in this area, which corresponds to the section between *points 1 and 2* on the side view.

Make it lumpy and bumpy

Referring to the top and side views, draw guidelines for carving the feather groups. Roughly sketch the lines, shown on the side view as shaded lines starting from *points 3, 4, and 5* and along the lower part of the body.

Using a finer cutter, such as a ruby carver, carve shallow grooves along these lines to set them off. Then, referring to the photos and illustrations, shape the areas established by the lines. Rely on the references to show which areas overlap others. Bird carvers sometimes call this stage—defining the feather groups—lumping and bumping.

Referring to the top view, draw the general outline of the tail feathers on the blank. Think of a couple of overlapping tongue depressors for the shape. The tail curls lengthwise; shape it by carving away the outside edges on top and the center on the bottom, as shown *below (E)*. Carve it to about ⅛" thick.

The primary flight feathers of our sitting cardinal's folded wings lie along the back of the body. To separate and define the primary groups, carve a channel where shown by the shaded area on the top view. (Refer also to the photos.) Begin the groove at the surface in the vicinity of Point 4 and slope it almost to the tail's top surface. Sand the bird to soften the curves and blend the areas together. Your carving should now resemble the one *below (F)*.

Next, put on some plumage

Study the feather patterns shown in the three pattern views. Sketch the lines onto the appropriate areas of the carving. Draw the tail and wing feathers where shown, and sketch in the center ribs where shown.

When drawing the feathers on the front and lower body and the back, you don't need to copy the pattern precisely. Just capture the general arrangement and direction of lay for the feathers.

Carve the feathers with ruby carvers. For the body feathers, cut shallow grooves along the lines as you did earlier. Employ a sanding disc to define the wing and tail feathers. In both cases, start from the top of the feather group and work down, carving the visible portion of each feather.

Add lifelike details

Now, shape the bill. Draw a line along the side to separate the maxilla (upper part) from the mandible (lower part). Study the three views and the photos as you carve the bill. The carving should now look like the one *below (G)*.

To set the eyes in place, mix a ball of epoxy wood filler about the size of a pencil eraser. Push some into the eye hole on each side, then press a 4 mm dark brown glass eye into the epoxy. Refer to the photos—don't set the eye too far into the head.

After the epoxy cures, blend the eye area into the head and model the eyelid, following the photos and illustrations. A knife with a sharp point comes in handy at this stage; power-carving bits can scratch the surface of the eye.

Texturing adds the final touch of realism, simulating the look of feather barbs. For the cardinal, Randy suggests both woodburned and carved texture.

Woodburn the quills (the central shafts) and barbs (the side members that make up the vanes) for the tail and primary wing feathers. Start by drawing guidelines for the tapered quills. Then, with the flat edge of a knife-edged woodburning tool, depress the wood alongside the line, creating, in effect, a raised shaft down the center of the feather.

Out from the shaft, burn a series of closely spaced parallel lines to represent the feather barbs. They should flow toward the tip of the feather with a slight curvature, as shown in the illustrations. Adjust your woodburning speed and the woodburner temperature to make

E

F

G

the burned lines a medium toast color rather than charred black. Strive for uniform appearance, as shown *below (H)*. Woodburn the nostrils on the bill near the head.

Using the rotary carver with a texturing stone, striate the remaining feathers and groups. For the best effect, texture each distinct feather separately, introducing slight variations in depth or direction as shown in the photos *above*. Again, these cuts representing feather barbs should follow a natural flow along the bird's body. Picture how air would flow over the bird's body, and how the feathers would react to the flow.

With the carving completed, Randy power-brushes away loose wood fibers and sawdust, employing a nylon bristle brush (shown in front at the center in *photo A)* chucked into his power carver's handpiece. As he brushes, he watches for details that need last-minute fixing.

H

Paint a pretty bird

Spray on a coat or two of Deft lacquer to seal the carving for painting. This provides a smooth, nonabsorbent surface for painting. Power-brush the carving once more after the lacquer dries.

Randy paints his carvings with artists' oil paints. You could use acrylics, if you prefer. Standard colors needed for the cardinal are:

- Cadmium red medium
- Cadmium red dark (or deep)
- Cadmium yellow
- Burnt umber
- Ivory black or Mars black
- Prussian blue
- Payne's gray

Thin the colors for brushing, and apply thin coats. Thin coats allow you to build color without covering up the carved details.

Paint the sides and breast with cadmium red medium. Continue that color onto the head, then blend toward cadmium red dark at the top of the crest. For the back, wing feathers, and tail, add burnt umber and Payne's gray to the cadmium red medium.

Add a touch of Prussian blue to either ivory black or Mars black for the throat. On the bill, shade from cadmium yellow near the line that separates the mandible and maxilla to cadmium red medium. (If you're using acrylics, Randy suggests stippling the yellow on first—putting it on in a dot pattern with the tip of the brush— then painting the red.)

Build a display base

All that remains is to place your carving on a suitable base. To make a simple base, cut an oval or rectangle from ¾"-thick hardwood. You could rout a chamfer or bead along the top edge, too. Drill a ¼" hole ½" deep in the center, and attach the carving to the base with a ¼" dowel pin ⅞" long.

For his carving, Randy constructed a turned base with simulated snow to highlight the winter cardinal. Here's how to make one:

Bandsaw a 7¼"-dia. circle from 1⅛"-thick stock. Center your lathe's faceplate on the back of the circle. Turn the disk to the profile shown.

Fill the recess with a nonshrinking filler. After the filler cures, drill a ¼" hole ¾" deep in the base's center. Stick a length of scrap dowel rod into the hole.

Coat the filled area with acrylic textural medium (we applied DecoArt Snow-Tex, available at craft supply stores) or thick, white enamel. While the surface is tacky, dowel the carving to the base, and sprinkle crystal clear glitter all over the area around the bird. (We bought our glitter at a craft supply store, too.) Let the surface dry, then shake off the excess glitter.

Buying Guide

Roughout. Machine-carved roughout from original carving, $15.95 ppd. in U.S. for one, $27.90 for two. Catalog of over 400 roughouts included with order, or available separately for $3.95 (refunded with first order). Rossiter's Roughouts, 1447 S. Santa Fe, Wichita, KS 67211, or call 800/825-2657 (800/8BLANKS) to order.

Project Design: ©Randy Hansen
Photographs: Hopkins Associates; Hetherington Photography
Illustrations: Roxanne LeMoine; Lorna Johnson

SEWING CENTRAL

Every seamstress' dream come true

When I designed this Shaker-style sewing cabinet, I set out to create a compact, yet attractive, piece of furniture with features and storage galore. I included in the cabinet a quality mechanical lift with which you can raise your sewing machine to two working positions, or lower it for easy out-of-sight storage. A special compartment also makes room for a serger. Drawer storage abounds, and the hinged cabinet top flips out in two directions, effectively doubling the countertop work surface. Hope you like it.

Jan Hale Svec
Assistant Design Editor

Start with the right- and left-hand pedestals

1 From ¾" cherry plywood (see the Buying Guide for our source of a hardwood lumber kit), cut the pedestal sides (A), tops and bottoms (B, C), shelf (D), and back (E) to the sizes listed in the Bill of Materials.

2 Cut the 12 drawer guides (F) to size from solid cherry stock. Drill four countersunk mounting holes through each.

3 Fit your tablesaw with a dado blade, and cut a ¾" rabbet ½" deep along the top and bottom edges on the inside face of the four pedestal sides (A). See the Pedestals drawing for reference.

Continued

The sewing machine lift allows you to use the machine in two different positions. The free-arm position is shown at right and the flush position is shown above. In its third position, as shown at far right, the machine stores out of sight.

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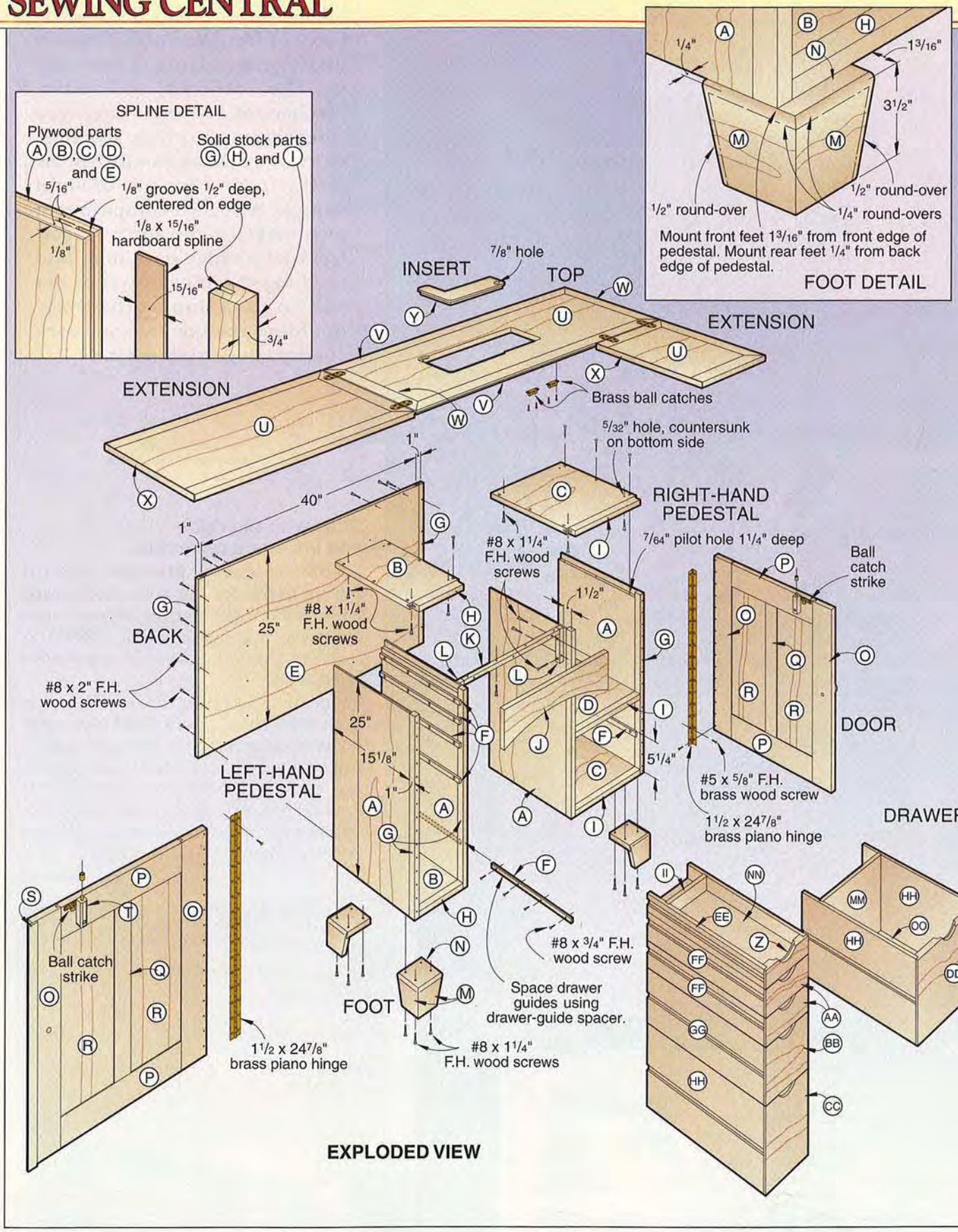

SPLINE DETAIL
Plywood parts A, B, C, D, and E
Solid stock parts G, H, and I
5/16"
1/8" grooves 1/2" deep, centered on edge
1/8 x 15/16" hardboard spline
1/8"
15/16"
3/4"
FOOT DETAIL
1/4"
1 3/16"
3 1/2"
1/2" round-over
1/4" round-overs
Mount front feet 1 3/16" from front edge of pedestal. Mount rear feet 1/4" from back edge of pedestal.
INSERT
7/8" hole
TOP
EXTENSION
EXTENSION
Brass ball catches
5/32" hole, countersunk on bottom side
RIGHT-HAND PEDESTAL
#8 x 1 1/4" F.H. wood screws
7/64" pilot hole 1 1/4" deep
Ball catch strike
DOOR
BACK
#8 x 2" F.H. wood screws
#8 x 1 1/4" F.H. wood screws
LEFT-HAND PEDESTAL
#5 x 5/8" F.H. brass wood screw
1 1/2 x 24 7/8" brass piano hinge
DRAWERS
Ball catch strike
1 1/2 x 24 7/8" brass piano hinge
FOOT
#8 x 3/4" F.H. wood screw
Space drawer guides using drawer-guide spacer.
#8 x 1 1/4" F.H. wood screws
EXPLODED VIEW

Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
PEDESTALS					
A sides	¾"	15⅛"	25"	CP	4
B top & bottom	¾"	15⅛"	8¼"	CP	2
C top & bottom	¾"	15⅛"	14"	CP	2
D shelf	¾"	15⅛"	13½"	CP	1
E back	¾"	25"	40"	CP	1
F guides	9/32"	11/16"	15¾"	C	12
G* banding	¾"	1"	25"	C	6
H* banding	¾"	1"	7¼"	C	2
I* banding	¾"	1"	13"	C	3
J kneehole apron	¾"	4"	18¾"	C	1
K cleat	¾"	¾"	17¼"	C	1
L cleats	¾"	¾"	3½"	C	2
FEET					
M* sides	¾"	3½"	4"	C	8
N gussets	¾"	3¾"	3¾"	C	4
DOORS					
O side stiles	¾"	3¼"	24⅞"	C	4
P rails	¾"	3¼"	15"	C	4
Q muntins	¾"	2"	18⅞"	C	2
R* panels	13/32"	6¾"	18⅞"	LCP	4
S astragal	¼"	1"	24⅞"	C	1
T supports	¾"	¾"	2½"	C	2

Part	Finished Size T	W	L	Matl.	Qty.
TOP AND EXTENSIONS					
U top panels	¾"	14½"	40½"	CP	2
V* banding	¾"	2"	44½"	C	4
W* banding	¾"	2"	18½"	C	4
X banding	⅛"	¾"	18½"	C	2
Y insert	¾"	varies		CP	1
DRAWERS					
Z front	¾"	1⅞"	7⅛"	C	1
AA fronts	¾"	2⅞"	7⅛"	C	2
BB front	¾"	5⅞"	7⅛"	C	1
CC front	¾"	9⅝"	7⅛"	C	1
DD front	¾"	9⅝"	12⅞"	C	1
EE sides	½"	1⅞"	15⅞"	BP	2
FF sides	½"	2⅞"	15⅞"	BP	4
GG sides	½"	5⅞"	15⅞"	BP	2
HH sides	½"	9⅝"	15⅞"	BP	4
II back	½"	1½"	6⅜"	BP	1
JJ backs	½"	2½"	6⅜"	BP	2
KK back	½"	5½"	6⅜"	BP	1
LL back	½"	9¼"	6⅜"	BP	1
MM back	½"	9¼"	12⅛"	BP	1
NN bottoms	⅛"	6⅝"	13⅝"	H	5
OO bottom	⅛"	12⅜"	13⅝"	H	1

*Initially cut parts marked with an * oversized. Trim to finished size according to the instructions.

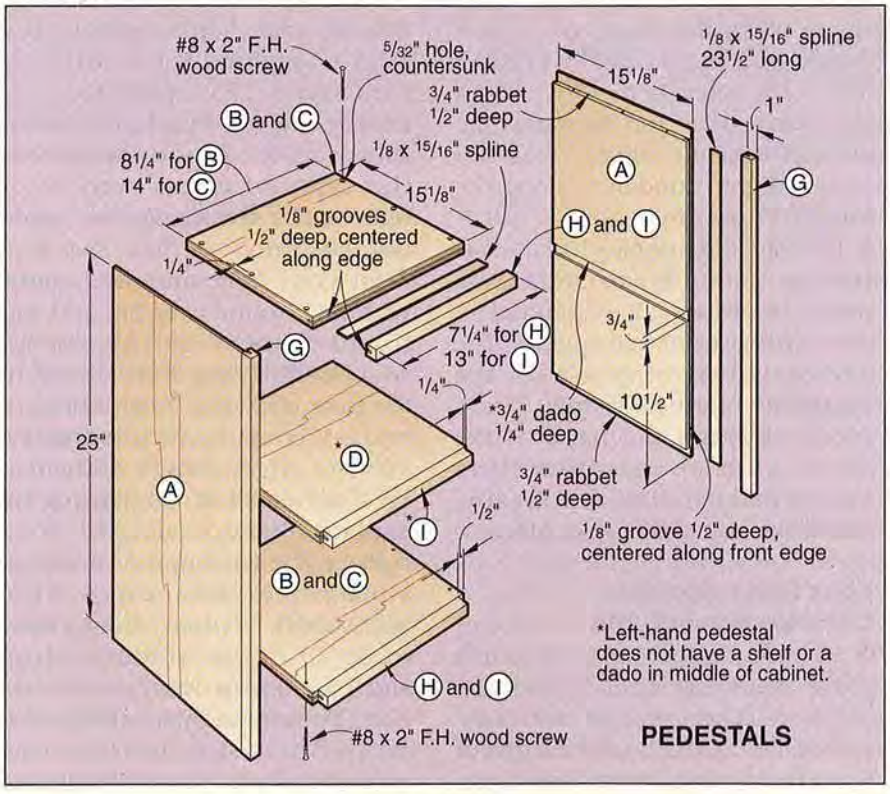
Materials Key: CP–cherry plywood, C–cherry, LCP–laminated cherry plywood, BP–birch plywood, H–hardboard.

Supplies: #8×1¼" roundhead brass wood screws, #8 brass flat washers, #8×¾" flathead wood screws, #8×1¼" flathead wood screws, #8×2" flathead wood screws, #12×⅝" panhead sheet metal screws, 2–5/16" brass flat washers, clear finish.

Buying Guide

Hardware kit. Two pair of brass sewing machine hinges, part no. 32284, two twin-ball catches, part no. 28662, one pair of 1⅝" classic cherry Shaker knobs, part no. 15265, a pack of table pins, part no. 32334, one sewing machine lift, part no. 33100, two 1½×36" brass piano (continuous) hinges, part no. 19283. The Woodworkers' Store, 4365 Willow Drive, Medina, MN 55340. Or, call 800/279-4441 to order.

Hardwood kit. All the individual pieces shown on the Cutting Diagram cut slightly oversized in length and width from the thicknesses and materials listed in the Bill of Materials. Available in cherry and oak. Heritage Building Specialties, Fergus Falls, MN 56537. Or, call 800/524-4184 to order.



4 To house the shelf (D) in the right-hand pedestal, cut a ¾" dado ¼" deep on the inside face in two of the side panels (A). See the Pedestals drawing for location.

5 Using solid cherry the same thickness as your plywood (we had to plane our solid stock to 23/32"), cut the pedestal banding strips (G, H, I) to size plus 1" in length each.

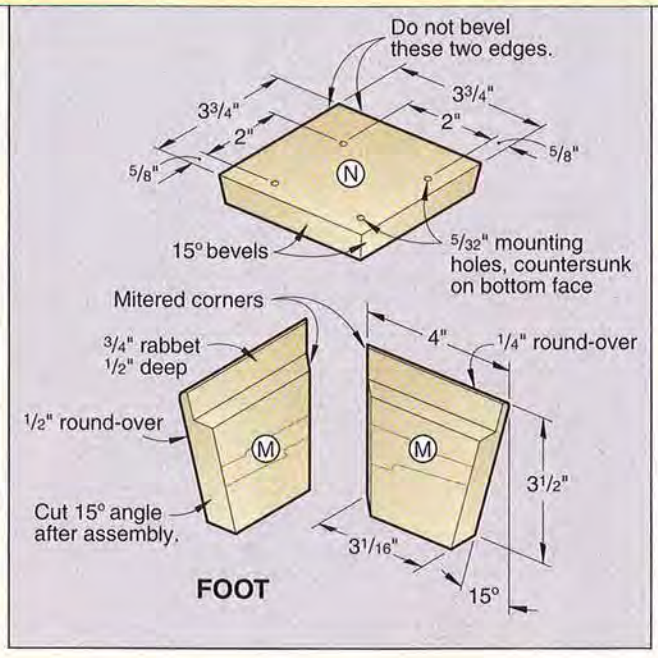
6 Cut or rout a ⅛" groove ½" deep in the mating edges of the plywood panels and banding. (We used a pencil to letter the mating pieces for ease in assembling them later.) See the Spline detail accompanying the Exploded View drawing for reference.

7 Cut strips of ⅛" hardboard to 15/16" wide for joining the banding (G, H, I) to plywood panels (A–E).

8 Glue, spline, and clamp the banding (G) to the front edge of each of the plywood side panels

Continued

A pair of dadoed spacers allow you to accurately locate the drawer guides on the inside of the side panels.



(A) and to both edges of the back (E). Use a damp cloth to immediately wipe off any excess glue. Later, trim the banding flush with the ends of the plywood panels.

Add the drawer guides, and assemble the base

1 To ensure evenly spaced drawer guides (F), cut a piece of stock to ¾×2×23½". Crosscut dadoes in the stock exactly where located on the Drawer Guide Spacer drawing on the Parts View in the *WOOD PATTERNS*® insert in the center of the magazine. Rip the piece in half. As shown in the photo *above*, use the spacers to locate the drawer guides on the inside face of the left-hand pedestal side panels (A). The top end of the spacers should be flush with the shoulder of the rabbet along the top end of each side panel. Drive the screws.

2 Glue and clamp each of the pedestals together, making sure to glue and clamp the shelf in place in the right-hand pedestal. Measure the opening, and cut banding pieces (H, I) to final lengths. Glue, spline, and clamp the banding in place.

3 Clamp the banded back (E) to the backs of the pedestals. The ends of the back should be flush with the outside surfaces of the pedestals. Drill countersunk mounting holes, and screw the back to the pedestals.

4 Cut the kneehole apron (J) to shape using the Kneehole Apron drawing on the *WOOD PATTERNS* insert for reference. (We used a thin strip of wood to mark the curved bottom edge.) Rout or sand a slight round-over along the bottom edges of the apron.

5 Cut the cleats (K, L) to size. Drill mounting holes, and screw the side cleats (L) in place 1½" back from the front edge of the pedestals where shown on the Exploded View drawing. Then, screw through the back of the cleats to secure the apron (J) to the front of the cleats. Finally, screw the top cleat (K) in place.

Four feet raise the base to new heights

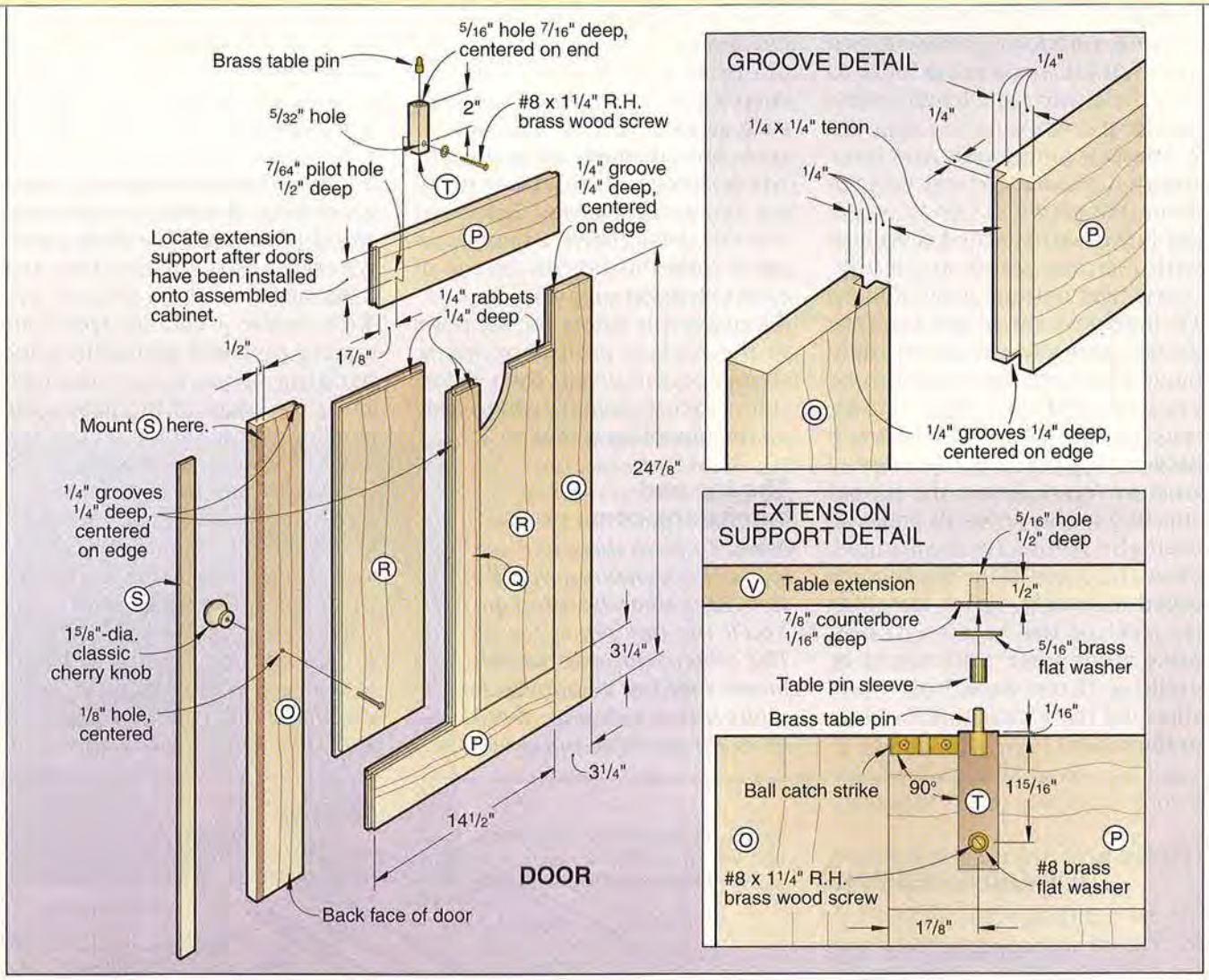
1 To form the foot sides (M), cut a piece of cherry to 3½" wide by 36" long. Then, cut or rout a ¾" rabbet ½" deep along one edge of the stock. Now, crosscut eight foot sides (M) from the 36"-long strip to 4" long each, miter-cutting one end of each piece. See the Foot drawing for reference.

2 Cut the foot gussets (N) to 3¾" square. Drill four countersunk mounting holes through each gusset where shown on the drawing.

3 Glue and clamp the four feet (M, N) together. Later, mark and bandsaw a 15° taper along the outside edges of each foot where shown on the Foot drawing. Sand the tapered edges smooth to remove the saw marks (we used a disc sander).

4 Fit your table-mounted router with a ½" round-over bit, and rout round-overs along the *outside edges* of the feet where shown on the Foot drawing. Switch bits and rout a ¼" round-over along the *top outside edges* where shown on the Foot detail accompanying the Exploded View drawing.

5 Place the base upside down on a blanket. Position the feet and screw them in place. The feet protrude ¼" on the sides and back and 1 3/16" on the front of the cabinet. (To accurately locate the feet on the pedestal bottoms, we taped ¼"- and 1 3/16"-wide spacers



to the bottom outside edges of the pedestals, and positioned the feet against these spacers.)

Construct a pair of frame-and-panel doors

1 Cut the door stiles (O), rails (P), and muntins (Q) to the sizes listed in the Bill of Materials.

2 Fit your tablesaw with a ¼" dado blade, and cut ¼"-deep grooves centered along the edges of the stiles, rails, and muntins where shown on the Door drawing and Groove detail.

3 To form the door panels (R), cut eight pieces of ¼" plywood to 7" wide by 19¼" long. Glue the pairs together with the good sides out.

4 Rip and crosscut the four laminated door panels (R) to final size.

5 Cut or rout ¼"-wide rabbets along the back face of each door panel deep enough to leave a ¼" lip on the four sides of each panel. The lip should fit snugly into its mating grooves in the door stiles and rails. (Test-cut scrap first. Our laminated plywood panels measured 13/32" thick, so it took a few test passes to get a lip that would fit perfectly in the grooves in the stiles and rails.)

6 Cut ¼" rabbets on both ends of the rails (P) and the muntins (Q) where shown on the Door drawing to fit into the previously cut grooves in the stiles and rails.

7 Dry-fit the doors together. Lay a straightedge across each door to be sure all parts come together flat and square. Mark mating joints for ease in assembly later.

8 Disassemble the doors, and sand a very slight round-over along the edges of the stiles, rails, and muntins that are next to the panels. It's difficult to sand these edges later after the doors have been assembled. Then, glue and clamp each door together, checking for square. Later, remove the clamps and finish-sand each door.

9 Cut the astragal (S) to size. Glue it to the back face of the left-hand door where shown on the Door and Exploded View drawings.

Continued

Hinge the doors to the base

1 Using a hacksaw, crosscut two pieces of 1½" brass piano hinge to 24⅞" long (the same length as the two front doors).

2 Attach a hinge *with just three screws* to the outside edge of each door. (We used a VIX bit to center the holes, and attached the hinge with just one screw at the top, center, and bottom of each door.) Then, remove the hinges from the doors, and use the same technique to secure the hinges to the pedestals with just three screws, placing the top edge of each hinge *1/16" from the top edge of each pedestal*. Leave the hinges attached to the pedestals and reattach the doors to the hinges. Close the doors. If the doors come together evenly, finish installing the rest of the screws. If not, make appropriate adjustments by drilling three new holes and adjusting the location of the door to the hinge.

3 For supporting the extensions, cut a pair of extension supports (T) to size. Drill a 5/16" hole 7/16" deep, centered into the top end of each support. Drill a 5/32" countersunk hole through each support where shown on the Door drawing and accompanying Extension Support detail. Drive a brass table pin into the 5/16" hole in the top of each extension support.

4 Temporarily screw the supports to the back of each door where shown on the detail. Each extension support should swing freely on the mounting screw.

The top and extensions come next

Note: *To form the sewing cabinet top and extensions, you'll make two identical banded panels. You'll use one panel for the top. The other, you crosscut into two pieces and use one piece for the right-hand extension and the other for the left-hand extension.*

1 From ¾" cherry plywood cut the two top panels (U) to 14½" wide by 40½" long.

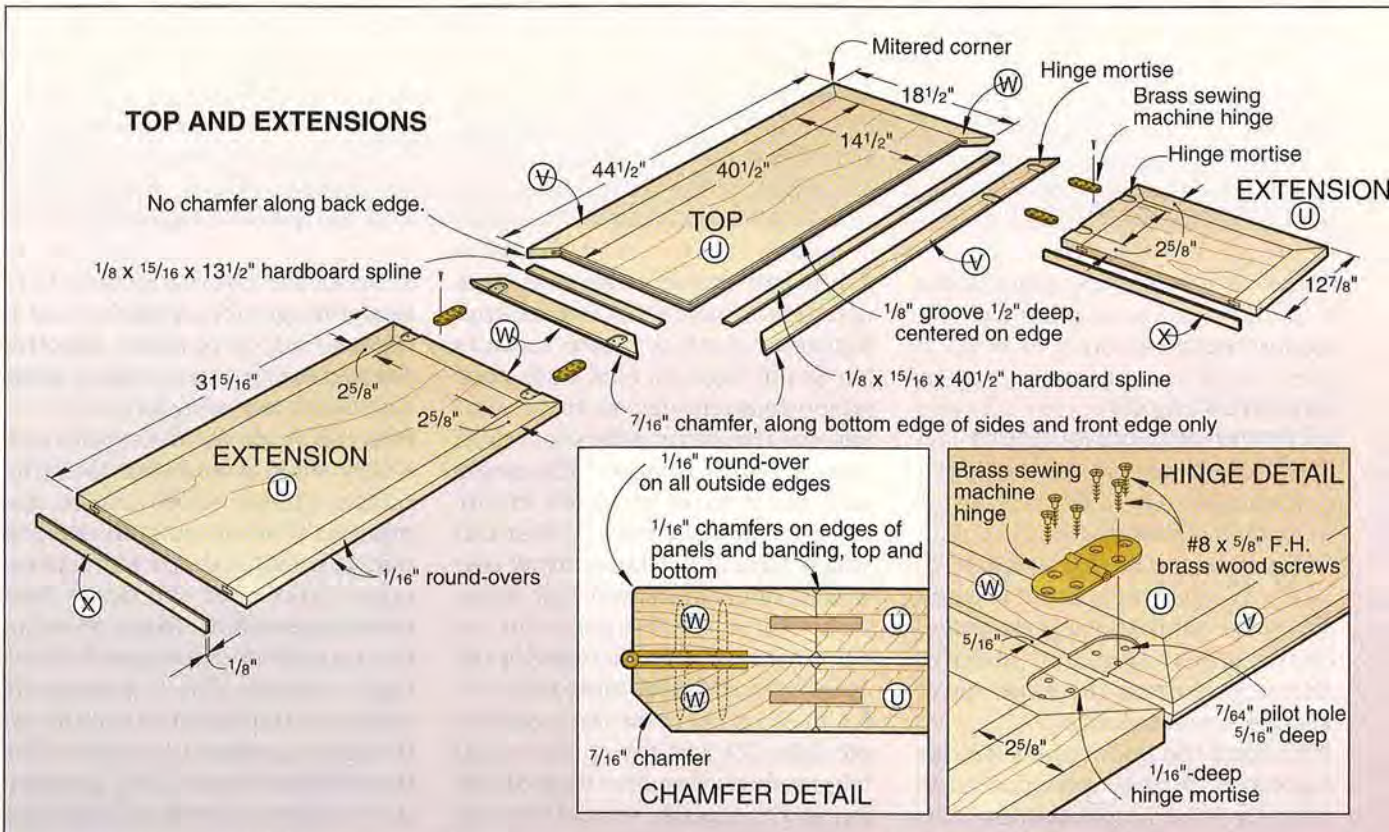
2 From solid cherry stock, cut the banding pieces (V, W) to size plus 1" in length.

3 Cut or rout mating spline grooves in the edges of the plywood panels and banding pieces where shown on the Top and Extensions drawing.

4 To create a vein between the mating plywood and solid-wood banding, rout a 1/16" chamfer along the edges of the panels and banding where shown on the Top and Extensions drawing and accompanying detail.

5 Miter-cut the banding pieces (V, W) to length. Then, glue, spline, and clamp the banding to the two plywood panels. Immediately wipe off any excess glue.

6 Crosscut one of the panels into two pieces as dimensioned on the drawing. (One panel is 31 5/16" long and the other 12⅞".) Now, cut



banding pieces (X) to size, and glue and clamp them in place.

7 Rout a 7/16" chamfer along the front and side bottom edges of the large banded panel only.

Add the solid-brass sewing machine hinges

1 To form perfectly shaped mortises, build the template shown on the Hinge-Routing Template drawing. The cleats on the end and edge of the plywood rotate, allowing you to position the template to rout all the mortises.

2 Fit your router with a 1" guide bushing and a 3/4" straight bit. Set the bit to cut to a depth equal to the thickness of the hinge. See the Routing detail accompanying the Hinge-Routing Template drawing. (We test-routed scrap stock first to verify the depth of cut and accuracy of template.)

3 As shown in the photo *below left*, rout the hinge mortises in the top surface of the top panel and mating edges of the extensions where shown on the Top and Extensions drawing.

4 Fit the hinges into the mortises and use a VIX bit to drill holes centered through the holes in the hinges and into the mortises. Mount the extensions to the top panel, and finish-sand the parts.

Mount the top and extensions to the base

1 Position the back edge of the top panel flush with the back edge of the base assembly. Center the top panel from side to side on the base. Clamp the top in place. Then, drive wood screws through the base tops (B, C) and cleat (K). Remove the clamps.

2 Open the left cabinet door 180° and open the top left extension to lay on the door. Turn the extension support (T) into its upright position, and mark its mating location on the extension with the brass pin protruding from the support. Flip the extension back onto the center panel, and use a Forstner bit to drill a 7/8" hole 1/16" deep. See the Extension Support detail accompanying the Door drawing for reference. Switch to a brad-point bit, and drill a 5/16" hole 7/16" deep centered inside the 7/8" hole. Epoxy the sleeve half of the brass tabletop pin into the 5/16" hole and a 5/16" brass washer into the 7/8"-diameter depression around the pin.

3 Repeat the operation to form the mating socket in the other extension for the opposite door.

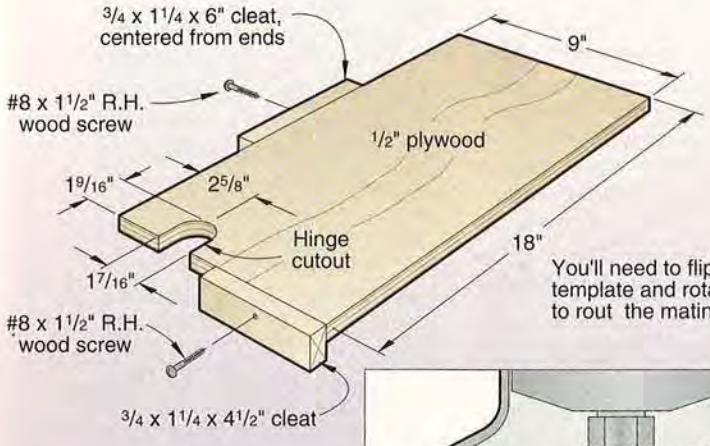
Form the opening and insert for the top panel

1 For ease in working with the top panel, remove the hinges and extensions.

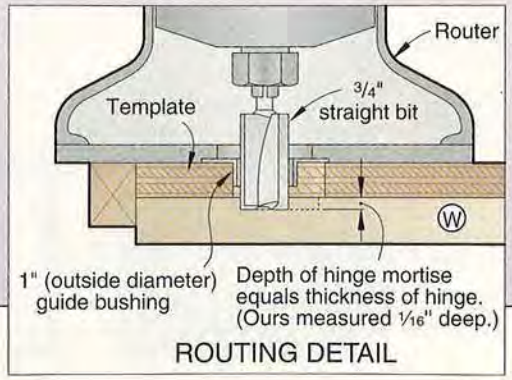
2 Using the instructions provided with the sewing machine lift mechanism (see the Buying Guide

Continued

Use the same template to rout all the hinge mortises in the top panel and mating extensions.


3/4 x 1 1/4 x 6" cleat, centered from ends
#8 x 1 1/2" R.H. wood screw
9"
1/2" plywood
1 9/16"
2 5/8"
Hinge cutout
18"
1 7/16"
#8 x 1 1/2" R.H. wood screw
3/4 x 1 1/4 x 4 1/2" cleat
You'll need to flip the template and rotate the cleats to rout the mating mortises.

HINGE-ROUTING TEMPLATE



ROUTING DETAIL

Using a portable router, a piloted straight bit, and straightedges, we straightened the edges of the cutout.

for our source), mount the lift to the plywood back panel (E). Center it between the pedestals and flush against the bottom side of the top (U). See the Front Section View drawing on the *WOOD PATTERNS*® insert for reference. (We used #12×⅝" panhead sheet metal screws.)

3 Referring to Creating the Sewing Machine Opening drawing on the *WOOD PATTERNS* insert, create the opening in the top panel (U) and form the insert (Y).

Next, add the drawers

1 Cut all the drawer fronts (Z–DD), sides (EE–HH), backs (II–MM), and drawer bottoms (NN, OO) to the sizes listed in the Bill of Materials.

2 Using the arc on the Parts View drawing, mark the handle cutout along the top edge of each drawer front (Z–DD). Bandsaw and sand the cutouts to shape. Then, rout a ½" cove along the inside surface of each cutout where shown on the Drawers drawing.

3 Cut ¾" grooves ¼" deep along the outside face of each drawer side (EE–HH) where noted on the Drawers drawing. Cut a ½" dado ⅛" deep on the inside face to house the drawer back (II–MM).

4 Cut ½" rabbets ½" deep along the edges of the drawer fronts and ⅛" grooves ¼" deep ¼" from the bottom edge where shown on the drawing.

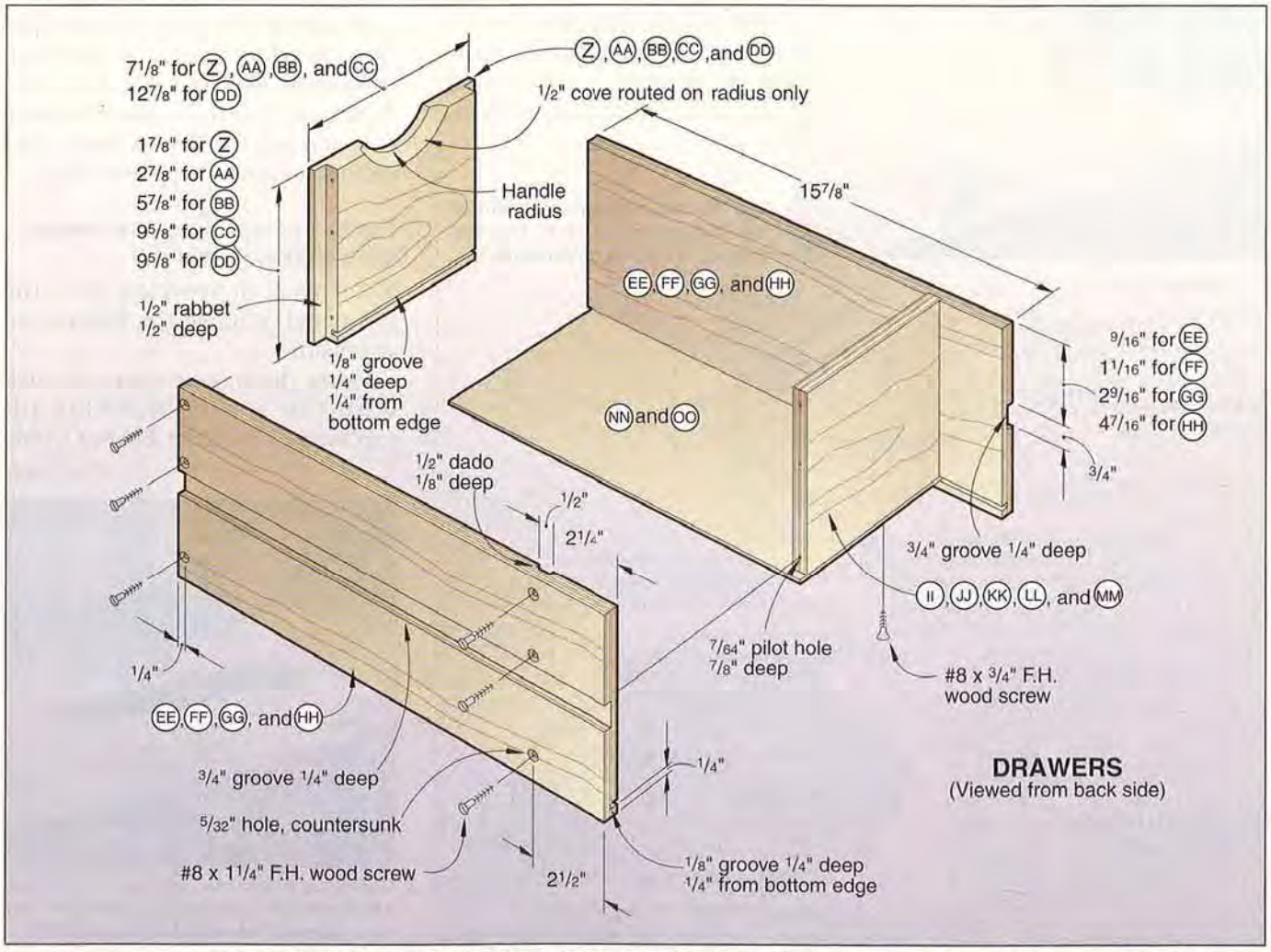
5 Glue and screw each drawer together, checking for square.

Finishing and final assembly

1 Remove all the hardware and extension supports from the cabinet and top. Finish-sand all the pieces, being careful not to sand through the thin veneer.

2 Add several coats of clear finish to all the pieces. (We started with one coat of a penetrating oil finish to bring out the color of the cherry. After this had thoroughly dried, we applied several coats of Deft lacquer, rubbing lightly between coats with ultrafine [gray] Scotch-Brite pads.)

3 Reattach the doors, supports, catches, knobs, and hinges to the cabinet and the extensions to the top. Reattach the sewing machine lift. Install the drawers.



Written by Marlen Kemmet Project Design: Jan Hale Svec Illustrations: Kim Downing; Lorna Johnson Photographs: John Hetherington

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Something's fishy Key Ring

See related article on page 33

To Peter Chapman, anything can become a puzzle. Want to try Peter's puzzling technique? This fish key ring is the perfect project. It'll only take you a few minutes at the bandsaw, so after the first, don't be surprised if you make more.

For the key ring, you'll need the following materials:

- *A ¾×1×3⅛" piece of stock*
- *A ⅛" dowel 1" long*
- *Clear finishing material*
- *A metal key ring*

First, shape your fish

Rip and crosscut a piece of ¾"-thick stock (Peter chose cocobolo for this fish) to 1×3⅛". Then, make one photocopy each of the full-sized Side and Top View patterns shown *below right*. Adhere the Top View pattern to the top (the ¾" side) of your stock, and saw it to rough shape following the outside lines. Next, adhere the Side View pattern to the 1" side of your stock, and saw to the outside pattern lines.

Remove all paper from the stock, then smooth the edges and sand the fish to final shape with coarse sandpaper (60-grit). Finish-sand with 80-grit, then 120-grit.

Puzzle up your fish

Now, you're ready to puzzle. But first, saw the notch that represents the fish's mouth. Next, with a pencil, sketch the red cutlines shown in the Top View drawing on the top of the fish blank (close is good enough). At your bandsaw, saw the fish's body along the line you drew to remove Part A (Peter uses a ⅛" blade with 14 teeth per inch). Then, turn the fish on its side and sketch the red cutlines for the side, as shown on the Side View. As before, saw to the pencil line to remove Part B. Turn the fish right side up again (to sit on its belly) and saw along the line that frees Parts C and D.

After bandsawing, you have a fish body with four loosely interlocking parts. To keep them together, join the parts, then drill a ⅛" hole through the fish's head where shown in the Side View pattern (use a backing board). Cut a ⅛" dowel to ¾" length, round each end and insert it into the eye hole. When in place, the dowel "locks" the puzzle. Lastly, with a 3/16" bit, drill a hole through the fish's tail where shown to accept a key ring.

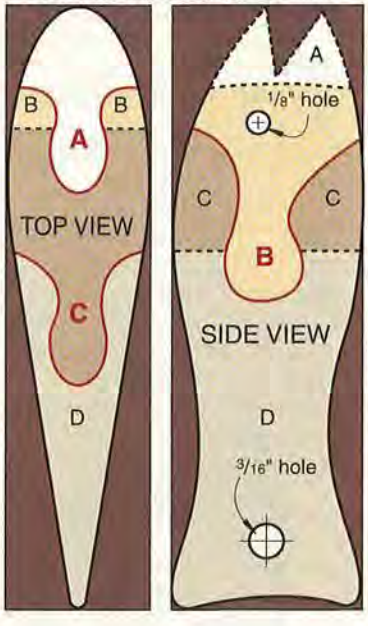
Remove the rough stuff

Go over the fish with 120-grit paper to knock down any raised wood along the saw lines and drilled holes. When smooth, coat the outside surface of the fish with a clear finish and let dry. To complete, add the key ring.

Drawings: Roxanne LeMoine
Design: Peter Chapman © 1996

FISH FULL-SIZED PATTERN

Red lines indicate bandsaw cuts



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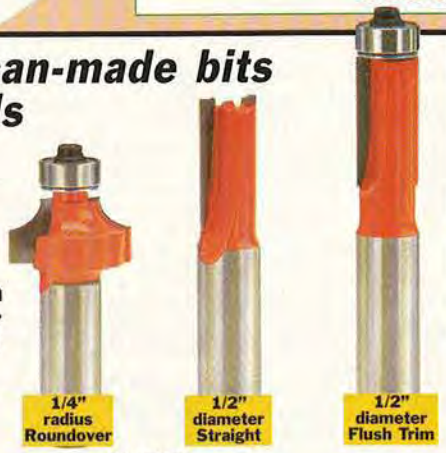

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Contest rules:

- No purchase necessary
- Entries must be received by April 30, 1997
- CMT Tools employees & families ineligible.
- Void where prohibited
- Entrants must be at least 18 years old.
- Winner will be drawn at random from all complete entries on May 1, 1997.
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Official Contest Entry Form

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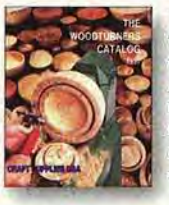
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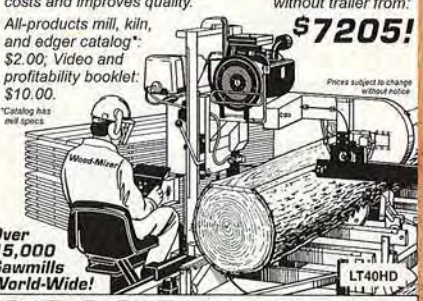

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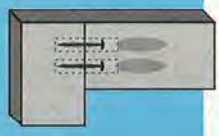

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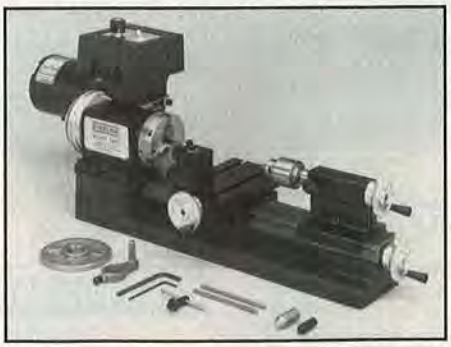

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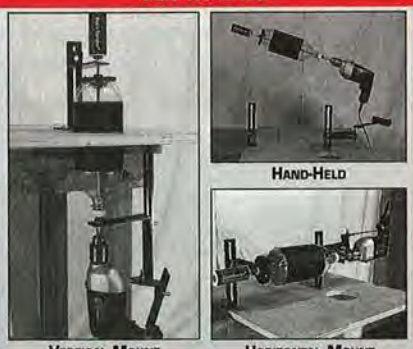

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Plug cutters give woodworkers a way to produce face-grained plugs, but if the hole being plugged is even slightly undersized, they won't fit. If the hole is too large—from drill-bit wobble or drill runout—the plugs leave unsightly gaps.

Veritas solved the fit problem several years ago by introducing a set of tapered plug cutters. MLCS and Wolfcraft followed suit and Woodworker's Supply just introduced still another set. To find out which tapered plug cutters work best, I tested all four brands.

In the course of the testing, I discovered that if the cutters shredded the wood, the plugs didn't fit tight, leaving small gaps around the hole. Also, the cutters start by making an oversize cut, then progressively taper the plug the deeper they are plunged into the wood. So, if you cut plugs too shallow, they may not fit into the hole. Cut them too deep, and they may bottom out before they fit tight, leaving gaps around them.

Veritas cutters shave wood

The Veritas Snug Plug cutters created the best-fitting, most consistent plugs. The four-finger cutters cleanly shave wood like a sharp Forstner bit, leaving the sides of each plug glass smooth. They cut the first ⅛" of the plug with no taper, and chamfer the edge, making the plugs easy to insert. The rest of the plug has a gentle 3° taper. You can buy the Snug Plug cutters in a three-piece set (¼", ⅜", and ½") or purchase them individually (about $12.95 each).

Wolfcraft offers freehand drilling

Unlike the open four-finger design of the Veritas cutters, the Wolfcraft cutters resemble an open cylinder. The sharpened edges of the cylinder slice through the wood. I liked working with these cutters because I could use my handheld drill instead of my drill press.

Overall, these cutters performed well, but got extremely hot. Under prolonged use at high temperatures, the steel could lose its hardness and dull quickly. Wolfcraft cutters come in a four-piece set (¼", ⅜", ½", and ⅝") or individually (about $8.00 each).

MLCS cutters a mixed bag

MLCS combines both styles of tapered plug cutters into one boxed set. The eight-piece set contains ¼", ⅜", ½", and ⅝" cutters in both styles, and packaged in a wooden storage box for only $29.95.

I was impressed with the four-finger cutters. They produced plugs nearly as smooth as those made by Veritas. The cylinder cutters, however, shredded the wood, leaving plugs that were difficult to install and loose fitting.

The grind makes the difference

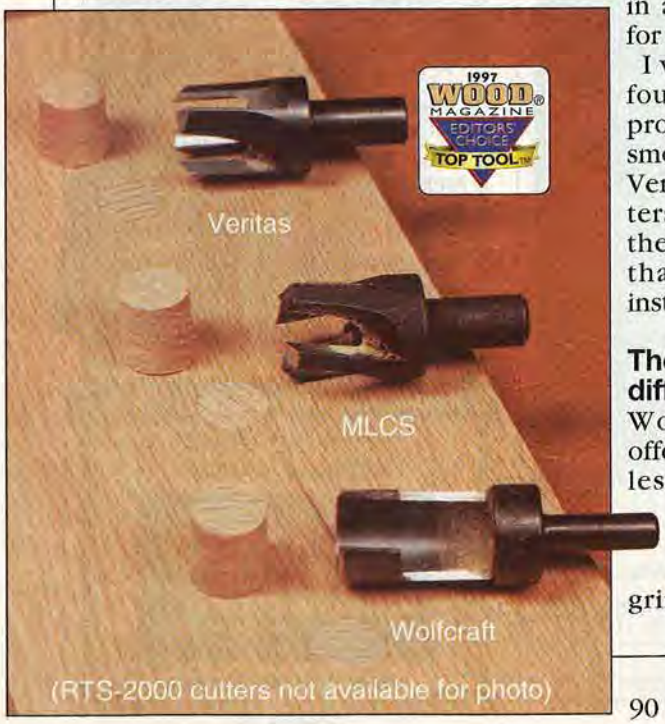
Woodworker's Supply offers a three-finger stainless steel cutter design with a radial relief grind—each finger has 10 different grinds. They cut aggressively, but didn't heat up no matter how fast I cut plugs. But the ½" cutter tended to chatter and walk. A set of three (¼", ⅜", and ½") costs $29.95. Individual cutters range from $8.95 to $12.95.

All work, but Veritas tops

The cutters from Veritas cut the nicest plugs and were the most foolproof. The Woodworker's Supply and MLCS finger cutters give good results, but I'd definitely pass on the MLCS cylinder cutters. The freehand drilling feature of the Wolfcraft cutters is useful. Just be sure not to overheat these cutters.

—Tested by Bob McFarlin

Continued on page 92



PRODUCT SCORECARD

Veritas Three-Piece Snug Plug Cutters

Performance	★ ★ ★ ★ ★
Price	$29.95
Value	★ ★ ★ ★ ☆

Available through Garrett Wade Catalog (No. 44K02.04), 161 Avenue of the Americas, New York, NY 10013. Call 800/221-2942.

MLCS Eight-Piece Plug Cutter Set, No. 9160

Performance (finger cutters only)	★ ★ ★ ★ ☆
Price	$29.95
Value	★ ★ ★ ★ ☆

MLCS Ltd., P.O. Box 4053 C-20, Rydal, PA 19046. Call 800/533-9298.

Wolfcraft Four-Piece Tapered Plug Cutters, No. 3386

Performance	★ ★ ★ ★ ☆
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Wolfcraft, P.O. Box 687, 1222 W. Ardmore Avenue, Itasca, IL 60143. Call 708/773-4777.

RTS-2000 Three-Piece Plug Cutter Set, No. 908-340

Performance	★ ★ ★ ★ ☆
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Circle No. 860

Continued from page 90

Biscuit joiner design gives a better grip

Finally, somebody has re-designed the biscuit joiner to be held and used the way it should! Most biscuit joiners are really angle grinders in disguise—with a fence and a blade at the front of the machine instead of a grinding wheel. Ryobi went back to the drawing board and developed this innovative design that uses an in-line motor similar to those that power random-orbit sanders. I found the D-ring shape of the Ryobi's handle wonderfully comfortable to hold and operate.

The 6.0-amp. motor has plenty of power for #20 biscuits. The fence adjusts for height via two knobs and tilts to 135° with positive stops at 90° and 45°. At the rear of the machine, an unobtrusive dust-collection bag catches the majority of chips.

The plastic blade-plunge mechanism on this tool doesn't slide as smoothly as the top-of-the-line biscuit joiners. And, the fence requires a little patience to set it perfectly parallel to the blade. But you'll pay double for a better fence, and getting it set right only takes a few seconds.

—Tested by Bob McFarlin

PRODUCT SCORECARD

Ryobi Biscuit Joiner

Performance	★ ★ ★ ★ ☆
Price	about $100
Value	★ ★ ★ ★ ★

Ryobi Customer Service, P.O. Box 1207, Anderson, SC 29625. Call 800/525-2579.

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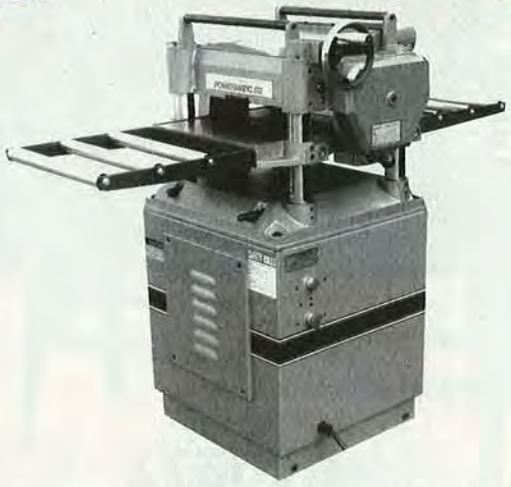

For the small production shop or the home craftsman, this Powermatic 15" Planer can handle a wide variety of planing requirements. The one piece cast iron table provides greater infeed and outfeed support of long stock. The table rollers allow rough material to be fed with less friction. The result is more accurate planing with a smoother finish. Many other quality features really enhance the value of this economical machine.

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The key to the ShopBoss is a steel-reinforced wooden backbone and folding steel-leg system. The backbone spans the wide-stance legs to provide a stable work platform. Steel wing braces and a pair of locking cams hold the legs rigidly in place under the backbone. The backbone extends from both ends of the unit to form "T" intersections that I found very handy for supporting or clamping smaller workpieces.

The ShopBoss folds flat for storage and takes up a fraction of the room required to transport a pair of sawhorses. The metal parts have a durable painted finish and come in red or blue.

— Tested by Dave Henderson

PRODUCT SCORECARD

ShopBoss Work Support System

Performance	★ ★ ★ ★ ★
Price	$59.95 plus shipping
Value	★ ★ ★ ★ ☆

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Continued on page 97

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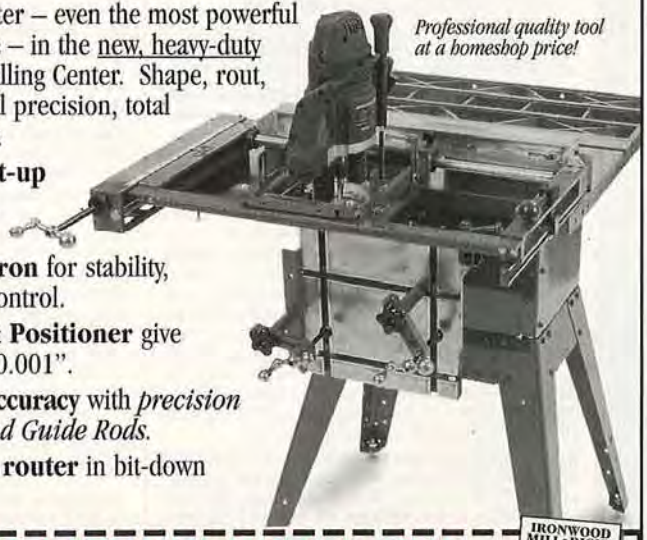

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Circle No. 83

Woodworker's Resource

You can get useful ideas and product information by mail. Use the coupon in this section to order your choice of literature listed below. Each company mails the catalogs or information directly to you.

POWER TOOLS

SCROLL SAW, CRAFT & WOODWORKING CATALOG—Our '96 catalog features the 7 models of HEGNER Precision Scroll Saws, the consistent choice of the experts. Complete information on scroll saw blades and accessories is included. Also ZYLISS Portable Vise, ACCURA Benchtop Combination Machine, HEGNER Lathes and Duplicators, METABO Hand Tools and PLANO Vertical Glue Press information. **ADVANCED MACHINERY.** Free. *Circle No. 3.*

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SHOP TESTED

Continued from page 93

Stop dust cold with the DusTrap

Most of us know the health hazards associated with breathing fine dust particles, but the thought of replacing our old reliable sanders and grinders just to acquire a dust-collection system seems a bit extreme. Now, someone has created a shroud that retrofits disc sanders without dust-collection capabilities.

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The dust port on the DusTrap accepts both 1¼" and 1½" vacuum hoses without any adapters. When hooked up to my shop vacuum, the DusTrap did an excellent job of removing the dust. Even when I ran the sander over an edge, little, if any, dust escaped.

— Tested by Dave Henderson

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PRODUCT SCORECARD

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Continued on page 98

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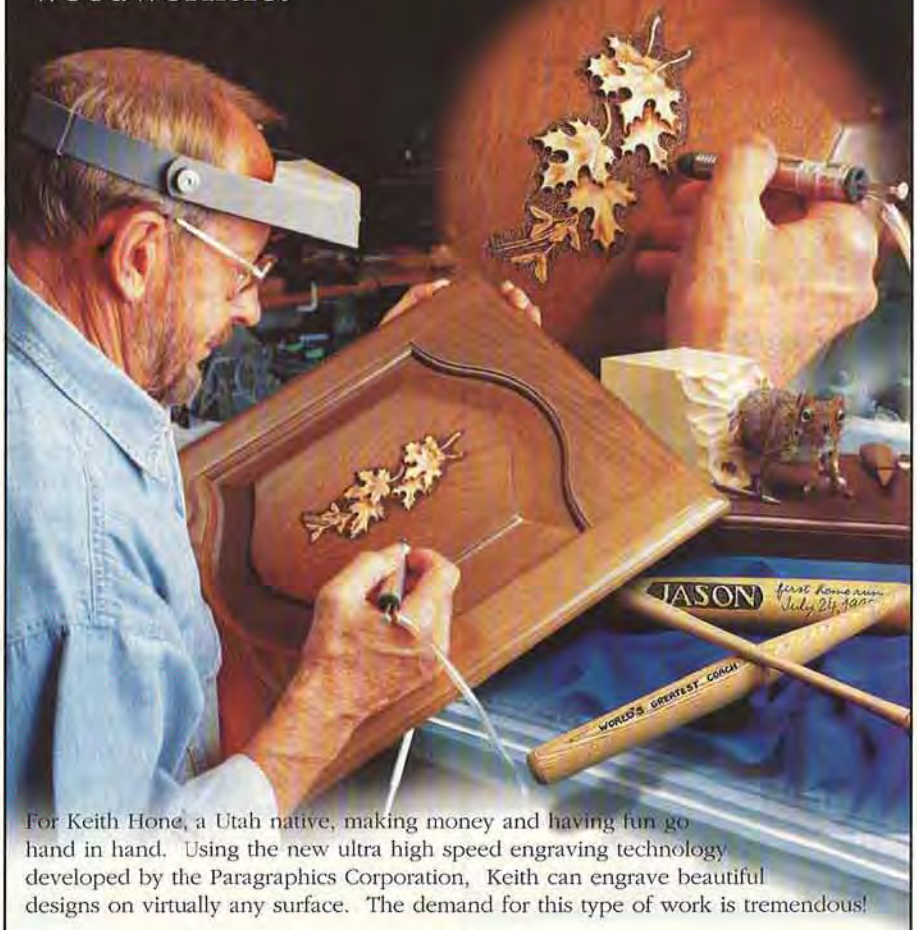

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PRODUCTS THAT PERFORM — SHOP TESTED

Continued from page 97

Porter-Cable makes a splash in economical air nailer market

With the number of air-powered fastening tools on the market today, any new entry needs to offer higher quality, better service, or better price. Porter-Cable scores high marks on all three counts with its new lineup of pneumatic nail guns.

Imported from Taiwan and distributed and serviced through Porter-Cable's dealer network, the tools include a ¼" narrow-crown stapler (½-1"), two 18-gauge brad nailers (⅝-1¼" and ¾-2"), and two 16-gauge finish nailers (¾-2" and 1-2½"). Also new, but not available for this test, are a 1½" narrow-crown stapler, a 15-gauge angled finish nailer, and two stick-type framing nailers.

I was impressed with the fit and finish of the entire line. The tools were well balanced and comfortable to use. The magazines were easy to load and have a convenient window on the side that lets you see at a glance when you're running low on fasteners.

The tools feature a quick-release nose piece for clearing jams and an excellent safety. The finish nailers also have rubber tips to prevent marring of the workpiece, but the tips prevented me from driving a nail in tight spots.

All the tools easily drive even the longest fasteners in both oak and maple and operated in either sequential-fire or bump-fire modes. Porter-Cable carries a full complement of fasteners, but the tools will accept most other brands' fasteners as well.

The nailers are extremely easy to maintain with top, bottom, and driver rebuild kits readily available to repair the problems that arise from normal wear and tear. The kits come with a comprehensive instruction sheet. To extend time between repairs, each tool comes with a dust cap that keeps debris out of the air fitting when the tool is not in use.

While priced higher than some other imports, these nailers give you a lot for your money. Each tool comes as a complete kit that includes the nailer with air fitting, a box of fasteners, air tool oil, wrenches, a detailed operator's manual, and even a pair of safety glasses. Everything fits neatly into a molded plastic case so that you don't have to track anything down to start a job.

Since our test, Porter-Cable re-engineered the larger finish nailer (FN250), giving it an adjustable depth guide while trimming its weight by more than a third.

—Tested by Dave Henderson

PRODUCT SCORECARD

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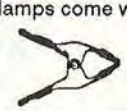

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WOOD ANECDOTE

Print this article

Don't you dare touch that tree! Manchineel

In South Florida and along the Keys, there grows a small tree that locals in the know disdain. A cousin to the Brazilian Para rubber tree, the manchineel (*Hippomane mancinella*) has played a sometimes lethal part in history.

It is reported that when the Spanish conquistadores arrived in the Florida Keys intent on conquest, the local Indians fought back with everything at their disposal. That included the poisonous sap of the manchineel, which they used to contaminate the Spaniards' water supplies. In fact, because even the tree's leaves can trigger painful reactions, the soldiers learned to fear and avoid it. In caution to others, one Spaniard wrote, "He who sleeps under a manchineel sleeps forever."

During the turn-of-the-century construction of railroad magnate Henry Flagler's extension to Key West of his Florida East Coast Railway, manchineel again reminded man of its dangers. According to Pat Parks writing in her book *The Railroad That Died At Sea,* in 1910 a hurricane suddenly overtook a section of the railroad's building site. Endangered by the raging storm, a construction superintendent secured himself to a nearby tree with his belt. Not until it was too late did he realize that his savior was actually a manchineel! Sap from the wind-splintered branches oozed into his open wounds, adding to his peril. The man lived, but spent many months in a hospital recuperating from the tree's poison.

Illustration: Jim Stevenson

Needless to say, the little manchineel tree has never earned renown as a supplier of woodworking wood. Even firewood gatherers have left it alone, for poison also lingers in the smoke of burning manchineel.

To survive a hurricane, a workman tied himself to a manchineel tree, only to be poisoned as a result.

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The 6496-6 Slider's powerful 15 amp, MILWAUKEE motor is the largest in its class. Its 3-1/2-inch by 12-inch crosscut capacity allows users to cut larger pieces of stock than with similar sized sliding compound miter saws. And, the saw's precision axis mechanism uses heavy duty steel dual guide tubes for superior cutting accuracy. Wider miter angles of 59° right and 51° left exceed other saws on the market.

Milwaukee Electric Tool Corp.
13135 W. Lisbon Rd. Brookfield, WI 53005

Print this article

STAY-PUT, STAND-UP

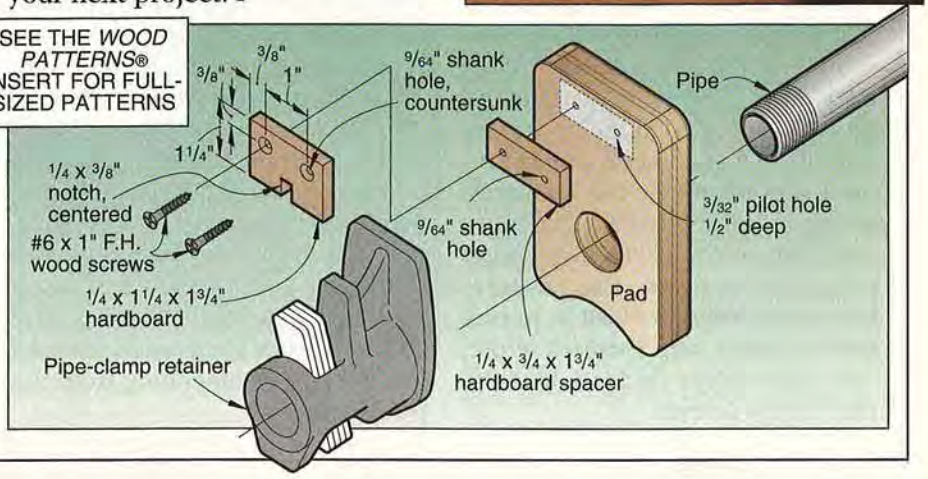
PIPE-CLAMP PADS

Trying to hold a scrapwood pad in place while snugging up a pipe clamp can prove next to impossible. And, the small base on most pipe clamps also makes them prone to tipping over. Our easy-to-make pipe-clamp pads solve both of these problems. You'll want to make a pair for every pipe clamp you own!

The pads shown here fit a Pony-brand ¾" pipe clamp, but you can adapt the design to fit other brands and sizes. For a ½" pipe clamp, drill a ⅞" hole. The size, shape, and location of the retainer notch also may vary.

To start, cut a ¾×3×24" piece of plywood, then lay out the shape and hole locations for four pads as shown in the *WOOD PATTERNS* in the center of this magazine. Cut the pads to shape, then bore the holes where marked. Sand or rout a slight round-over on all the edges. Cut the hardboard spacers and retainers to size, attach them with screws as shown, and you're ready to clamp down on your next project.

SEE THE *WOOD PATTERNS*® INSERT FOR FULL-SIZED PATTERNS



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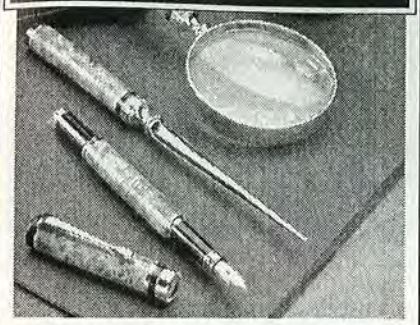

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* Rated #1 by Wood Magazine, December 1994.

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WOOD

Print this article

What? Your own tropical hardwood trees?

A brochure distributed at the American Association of Woodturners' 10th annual symposium in Asheville, North Carolina, touts the financial benefits of investing in tropical hardwood trees. According to the publication, $2,600 invested in young teak trees planted on Costa Rican plantations could yield about $103,000 in 25 years. Tropical American Tree Farms, a Costa Rican corporation formed by Americans Steve and Sherry Brunner, says the same amount put in savings or certificates of deposit drawing compound interest at 5 percent would bring you $8,805 in that period of time.

Betting that the future supply of teak and other tropical hardwoods will dwindle due to lost rain forest and restricted logging, Tropical American Tree Farms has put together an investment plan based on forest management. On its 3,700 acres, situated on Costa Rica's Pacific highlands, the company is planting 40 species of trees selected for growth potential and high value. Investors pay for the trees, the planting, management, and harvest costs, and share the profit. The operation is certified as environmentally sound by the Smart Wood Program of the Rainforest Alliance.

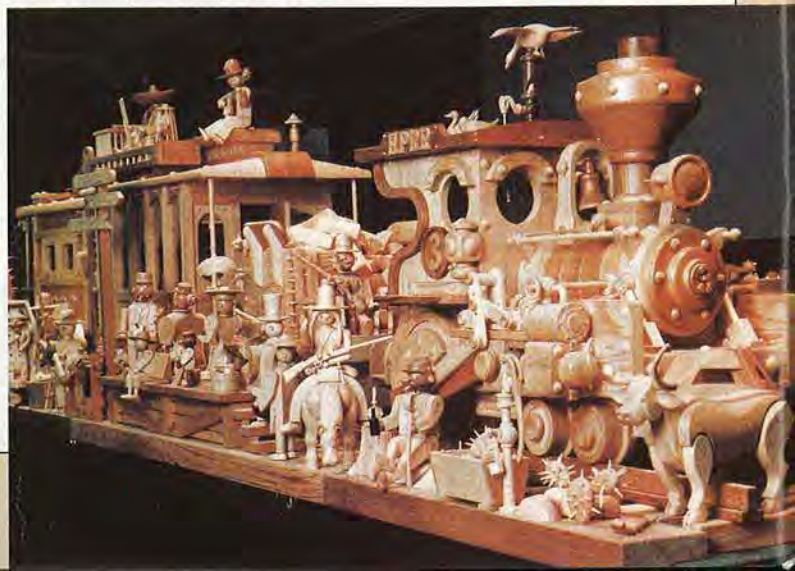
For a copy of the brochure, drop a line to Steve and Sherry Brunner, Tropical American Tree Farms, 717 City Park Ave., Columbus, OH 43206.

Project for a long Canadian winter: The Hokey Pokey Railroad

The winter of 1995 may have been particularly long in Delta, British Columbia, but woodworker J.A. Olson enjoyed it. "This train project [shown *below right*] started out as a joke, with the intention of making some hokey folk art," wrote the Canadian woodworker. "It was a winter project which I doubt will ever be regarded as complete."

J.A. calls his project the Hokey Pokey Railroad. "It runs between the towns of Backyonder and Hereabouts to Overthar," he penned. Using nothing but scrapwood of all kinds—mostly maple for the figures—J.A. primarily pinned the pieces together with dowels or round toothpicks so that they would come apart like a puzzle. For a finish, he hand-rubbed each piece with paste floor wax. The late-1800s-style train measures 80" long, 18" wide, and 25" high.

"With this, there are no plans to follow," he advises. "A simple sketch determines the sizes and proportions, then I start cutting. Each piece leads into the next. It's been great for those days when you get the urge to cut up some wood."



A cold winter in British Columbia— plus a ton of imagination and lots of scrapwood—sparked woodworker J.A. Olson's Hokey Pokey Railroad.

Photographs: Bill Krier; J.A. Olson Illustration: Jim Stevenson

Shavings fly to get wooden Stetson

Maple shavings flew in the *WOOD*® magazine shop when Vermont turner Johannes Michelsen demonstrated how to turn a wearable wooden hat.

When features editor Pete Stephano returned from Vermont with an article and photos about woodturner Johannes Michelsen ("Hats Off to Turning," *WOOD* magazine, October 1996), the rest of the staff wanted to see more. So, in accordance with our tradition of in-service training, we invited Johannes—who specializes in turning wooden hats—to demonstrate in our shop.

Early last summer, he did just that. While staffers watched mesmerized, Johannes turned a wearable wooden cowboy hat from start to finish in just about half a day. Johannes had brought the 40-lb. rough-cut chunk of red maple for the hat from Vermont, along with his favorite tools. We hauled in a Powermatic 91 lathe with a 16" swing specially for his use.

Over the hours, staff attention never flagged as the hat took shape. "It was the highest continuous interest level I've ever seen," said editor Larry Clayton. The hat now owns a special place in the *WOOD* magazine "trophy" case.

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31-695	6" Belt/9" Disc Sander	441	329
23-700	Wet/Dry Grinder	206	149
23-710	New Sharpening Center	217	169
23-680	6" Bench Grinder 1/4 HP	80	69
11-950	8" Drill Press	176	128
31-460	4" Belt/Disc Sander	198	135
40-560	16" 2 speed Scroll Saw	230	165
40-540	NEW 16" var/spd Scroll Saw	249	179
11-990	12" Bench Drill Press	255	184
11-090	32" Radial Bench Drill Press	405	305
43-505	1/2" Bench Router/Shaper	398	299
22-540	12" Bench Top Planer	Sale	369
36-220	10" Compound Mitre Saw	294	199
28-185	Bench Band Saw	213	175
37-070	NEW 6" v/spd Bench Jointer	351	245
14-650	Hollow Chisel Mortiser	280	239
33-990	10" Radial Arm Saw	981	779
33-055	8-1/4" Sawbuck comp w/legs	846	665
36-905	30" Unifence	346	245
36-906	50" Delta Unifence	444	319
36-755	10" Tilting Arbor Saw	Sale	1019
17-900	16-1/2" Floor Drill Press	490	399
37-190	6" Deluxe Jointer	603	489
36-275	8-1/4" Builders Saw	358	259
36-210	10" Compound Mitre Saw	344	225
36-040	8-1/4" Compound Mitre Saw	190	135
36-070	10" Mitre Saw	217	165
34-555	Sliding Table	487	325
34-444	10" Contractors Table Saw	Sale	615
36-250	10" Slide Compound Saw	625	489
36-230	12" Compound Mitre Saw	480	345
31-780	Oscillating Spindle Sander	253	188

DELTA REBATES !
Prices shown are before rebate !

$25.00 rebate

46-700	12" Wood Lathe	575	479

$50.00 rebate

28-275	14" Band Saw 3/4 HP	Sale	649
28-280V	14" Band Saw 1 HP motor	Sale	798
34-445	10" Table Saw w/30" fence	Sale	839
22-675	NEW DC380 15" Planer	Sale	1175
43-355	3/4" Shaper 1-1/2 HP	Sale	799

$75.00 rebate

37-154	6" Jointer DJ-15	Sale	1289

MILWAUKEE TOOLS

6527	NEW Sawzall with case	343	169
6528	above Sawzall w/wired cord	339	185
6537-2	6527 w/quick lok blade change	224	175
0408-6	12V Drill w/kyls chuck&2 batt	380	172
0224-1	3/8" Drill 4.5 amp magnum	236	132
0234-1	1/2" Drill 4.5A mag 0-850 rpm	255	129
0235-1	1/2" Drill w/keyless chuck	255	129
0244-1	1/2" Drill 4.5A mag 0-600 rpm	255	129
0222-1	3/8" Drill 3.5 amp 0-1000 rpm	213	119
0228-1	3/8" Drill 3.5 amp 0-1000 rpm	207	118
0375-1	3/8" close quarter Drill	255	148
0379-1	1/2" close quarter Drill	288	165
6546-1	cdls Scrwdvr 200 & 400 rpm	150	86
6547-1	6546-1 w/bits,1/4" chuck & cs	185	105
5399	1/2" D-hdle Hammer Drill Kit	356	194
6507	Original SawZall with case	278	149
5397-1	3.8" v/ spd Hammer Drill Kit	275	145
5371-1	1/2" v/ spd Hammer Drill Kit	360	194
3107-1	1/2" v/spd right angle Drill Kit	411	234
3300-1	1/2" v/ spd right angle Drill	378	199
5680	Router 2 HP w/ collets	367	165
6142	4-1/2" Grinder w/cse & acc.	224	125
6365	7-1/4" Circular Saw 13 amp,	229	125
6368	6365 w/fence, blde,& cse	259	142
6256	Top Handle Jig Saw	278	149
6490	10" Mitre Saw	496	265
6491	6490 w/ carbide blade & bag	594	328
6494	10" Compound Mitre Saw	585	315
0431-1	12V Drill w/ 2 batteries	441	229
6266-6	NEW Top Handle Jig Saw	315	165
6496	10" Slide Compound Saw	1050	569

FREUD CARBIDE TIPPED SAW BLADES
5/8" Bore - Industrial Grade

Item	Description	Teeth	List	Sale
LU72M010	Gen Pur. A.T.B.	10" 40	69	42
LU82M010	Cut-off	10" 60	93	47
LU84M011	Comb	10" 50	78	42
LU85M010	Super Cut-off	10" 80	115	59
LM72M010	Ripping	10" 24	69	38
LU73M010	Cut off	10" 60	84	45
LU87M010	Thin Kerf	10" 24	72	44
LU88M010	Thin Kerf	10" 60	88	49
LU98M010	Ultimate	10" 80	128	68
LU91M010	Compnd Mitre	10" 60	88	54
F410	Quiet Blade	10" 40	95	49
F810	Quiet Blade	10" 80	135	74
TK303	7-1/4" Finishing	40	38	25
TK906	10" Combo	50	53	32
SD308	8" Dado - Carbide		230	119
SD506	6" carbide w/case & shims		292	145
SD508	8" carbide w/case & shims		344	168
FB100	16 piece Forstner Bit Set		338	194
94-100	5 pc. Router Bit Door System		320	169
BF3	NEW Router Table		495	289
FJ85	NEW Top Handle Jig Saw		229	125

The following tools have a $30.00 rebate. Price shown is before rebate.

FT2000E	3-1/4 HP variable speed Plunge Router	410	205
JS102	Biscuit Jointer w/fence & cs	355	179

NEW Freud Carbide Dado Blades

SD608	8" dial-a-width dado	389	199
SD606	6" dial-a-width dado	369	189
SD208	8" economy dado	155	85

WAP VACUUMS

Model	Description	List	Sale
766RDF	10 gallon turbo vacuum	845	465
766RDF-D	"Drywaller" 10 gal turbo vacuum	915	549
766RDF-DAS	Above vac w/ auto start	950	589

MAKITA TOOLS

6172DWE	3/8" v/spd Drill Kit w/ 2 batt	222	109
5090DW	3-3/8" Saw Kit 9.6 volt	260	148
DA391D	3/8 angle Drill 9.6V	166	109
DA391DW	3/8" angle Drill Kit 9.6V	341	179
ML900	Incandescent Flashlight 9.6V		37

6095DWE	9.6 volt Drill Kit w/2 batt	Sale	125
6095DWLE2	6095DWE w/flashlight	Sale	138
6095D	6095DW Drill only & cse	Special	65
632007-4	9.6 volt Battery	47	30
632002-4	7.2 volt Battery	39	28
6201DWHE	9.6V 3/8" Drill Kit w/2 batt	351	159
6211DWHE	12V 3/8" Drill Kit w/2 batt	368	169
6311DWHE	12V 1/2" Drill Kit w/2 batt	399	205

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6233DWAE	14.4V 3/8" Drill Kit	358	199

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6073DW	7.2V cdls Drill Kit. Variable speed & clutch. Complete with battery, charger, & case.	Super Sale	99
T220DW	9.6 volt Stapler Kit. Complete with battery, charger, & case.	Super Sale	99

9900B	3"x21" Belt Sander w/bag	347	179
9924DB	3"x24" Belt Sander w/bag	360	189
4301BV	Orb. var. spd Jig Saw 3.5A	292	155
JR3000V	v/ spd Recip Saw w/case	264	135
9820-2	Blade Sharpener	433	215
N1900B	3-1/4" Planer with case	263	129
1912B	4-3/8" Planer	352	189
N9514B	4" Disc Grinder 4.6 amp	118	65
DA3000R	3/8" Angle Drill	355	175
2708W	8-1/4" Table Saw	637	309
6405	3/8" Drill Rev. 0-2100 rpm.	115	65
6510LVR	3/8" Drill Rev. 0-1050 rpm.	188	98
6013BR	1/2" Drill Rev. 6 amp	270	145
9401	4" x 24" Belt Sander w/bag	458	219
5007NBK	7-1/4" Circ Saw w/ case	250	125
5037NB	NEW 7-1/4" Circular Saw	288	148
LS1011	10" Slide Compound Saw	995	479
LS1211	12" Slide Cmpnd Saw	1620	779
3901	Plate Joiner Kit	376	199
3612C	NEW 3 HP Plunge Router	492	259
LS1040	NEW 10" Cmpnd Miter Saw	460	259

SENCO AIR NAILERS

SFN1+	Finishing Nailer 1" - 2" w/ cs	448	345
SN325	Nailer 1-7/8" - 3-1/4"	665	419
SLP20	Pinner w/cs 5/8 -1-5/8"	422	275
SKS	Stapler 5/8" - 1-1/2"	390	279
SN70	Framing -Clip Hd 2"-3-1/2"	725	449
SN60	Framing -Full Hd 2"-3-1/2"	708	449
SN65	15% more power than SN60709		469
SFN40	Finish Nailer 1-1/4 - 2-1/2	569	389

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N80S-1	Stick Nailer	Super Sale	339
N80C-1	Coil Nailer	Sale	339
RN45	Coil Roof Nailer 3/4 - 1-3/4	845	369
N60FN-2	Finishing Nailer	557	335
BT35-2	Brad Tacker 5/8" - 1-3/8"	254	155
BT35-2K	BT35-2 w/ cse, oil, & brads	279	165
CWC100	1 HP Pancake Compressor	440	289
MIIIFS	Flooring Stapler 15 gauge	902	529
S32SX-1	Finish Stapler-1/2" - 1-3/8"	245	155
S32SX-1K	S32SX-1 with case & oil	269	165

SKIL TOOLS

77	7-1/4" Worm Drive Saw	Sale	144
77M	NEW 77 Mag Worm Saw	Sale	165

PANASONIC CORDLESS

EY6181CRKW	9.8V Drill Kit w/ 2 batteries, 1 hour charger, & case	307	169
EY6181EQK	9.6 volt Drill with 15 min. charger, case & Ironman battery	315	169
EY6100CRKW	12 volt Drill Kit w/ 2 batteries, 1 hour charger, & case	379	188
EY6100CQKW	Same as EY6100CRKW but has 15 minute charger	409	209
EY6100EQKW	12V Drill kit w/ 2 Ironman batteries, 15 min. charger, & case	379	194
EY6101SQK	12 volt 1/2" Drill w/ 15 min. charger, diagnostic battery, & case	438	249
EY3502EQKW	NEW 4-3/8" 12V Metal Cutting Saw Kit	500	289

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IM250	Trimpulse Finish Nailer Kit	1130	548
IM325	Impulse Framing Nailer Kit	1130	548
CT325SS	Cdls Framing Nailer Kit	1120	495

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140	Portable sndr w/ 4-1/2" spindle	625	559
146	Portable sander w/ 9" spindle	685	609
100	Floor mount sndr 4-1/2" spindle	785	709
106	Floor mount sander 9" spindle	845	759

SIOUX TOOLS

8030	3/8" var/spd Drill	263	145
8000	3/8" var/spd close qtr Drill	211	125
690	5" Air Random Orbit Sander	228	132

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DW997K
1/2" Drill/Hammer
Drill Kit
Sale 249

DW936K
Saw Kit
Sale 249

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DEWALT TOOLS

Model	Description	List	Sale
DW321K	NEW Jigsaw Kit	300	164
DW364	7-1/4" Circ. Saw w/brake	294	158
DW610	1-1/2 HP 2 handle Router	265	152
DW411	1/4 sheet Palm Sander	88	58
DW100	3/8" Drill, 4 amp,0-2500 rpm	118	68
DW682K	Biscuit Joiner with case	448	199
DW705	12" Compound Mitre Saw	734	359
DW625	3 HP v/ spd PlungeRouter.	Sale	275

DW625 router comes with DW6965 fine depth adjuster and 8-piece template guide set

DW621	NEW 2 HP Plunge Router	400	218
DW675K	3-1/8" Planer with case	292	164
DW431	3 x 21 v/spd Belt Sander	338	184
DW421	5" Palm Ran. Orb Sander	144	74
DW444	6" Ran Orb Sander	266	139
DW443	DW444 w/hook & loop pad.	266	139
DW673K	NEW Laminate Trimmer Kit	364	205
DW935K	14.4V 5-3/8" Trim Saw Kit with 2 batteries	444	237

DEWALT CORDLESS DRILLS

DW952K	3/8" variable speed w/ two 9.6V XR batteries	284	139
DW962K	3/8" variable speed w/ two 9.6V XR batteries	330	179
DW972K	3/8" variable speed w/ two 12V XR batteries	362	189
DW904	12 volt flashlight	48	29.95
DW972K-2 drill & DW904 flashlight		*Sale*	*205*
DW991K	3/8" variable speed w/ two 14.4V XR batteries	415	225
DW994KQ	1/2" variable speed w/ one 14.4V XR batteries	458	235
DW994KQ-2	above drill w/ 2 batt	Sale	259
DW996K	1/2" w/spdw/ two 14.4 XR batt		245

Above drill kits come w/ charger & steel case!

DW991KS-2	DW991K drill, DW935 trim saw, & case	Sale	349

HITACHI TOOLS

C8FB2	8-1/2" Slide Compound Saw	1169	489
C10FC	10" Mitre Saw	533	209
C10FS	10" Slide Compound Saw	1627	739
G12SA	4-1/2" Grinder 6.9 amp	177	95
NR83A	Framing Nailer 2 - 3-1/2 Full Head	900	425
NR83AA	Framing Nailer 2 - 3-1/2	922	429
NT65A	16 ga. Brad Nailer 1 - 2-1/2	749	325
NV45AB	Coil Roofing Nailer 7/8 - 1-3/4	935	435
EC6B	1 HP Oil Compressor	540	279
EC6C	1 HP Oil-less Compressor	580	295

BIESEMEYER FENCES

B-50	50" Commer. Saw	443	325
T-SQUARE 52	52" Homeshop	360	269
T-SQUARE 40	40" Homeshop	335	249
T-SQUARE 28	28" Homeshop	325	239

PONY CLAMP FIXTURES

Model	Description	List	Sale	Lots of 12
50	3/4" Black Pipe	15.45	8.10	92.50
52	1/2" Black Pipe	12.65	6.95	74.95

BOSCH

Model	Description	List	Sale
1587VS	Top Handle "CLIC" Jig Saw	292	139
1587VSC	1587VS saw with case	Sale	149
1584VS	Barrel "CLIC" Jig Saw	288	139
Bosch Metal Case for above Jig Saws			24
Bosch 30 blade assortment for Jig Saws			28.99

1594VS or 1587VS

with steel case and 30 Bosch blades		Sale	175
3270DVS	3"x21" v/spd Belt Sander	301	165
1276D	NEW 4"x24" Belt Sander	379	219
1275DVSN	NEW 3"x24" v/s Belt Sndr	379	219
1276DVSN	NEW 4"x24" v/s Belt Sndr	408	229
1347AK	4-1/2" Grinder w/cs & acc.	172	105
1194VSR	1/2" v/ spd Hammer Drill	272	155
1194VSRK	above Drill w/ case	303	169
1604A	1-3/4 HP 2 Handle Router	269	142
1604AK	same as above w/cse & acc	337	185
1613EVS	2HP v/s Plunge Router	369	199
1615EVS	3 HP v/s Plunge Router	536	289
1634VSK	NEW Recip Saw 10.5 amp	335	159
3310K	NEW 12V T-handle Drill Kit	345	178
3610K	NEW 14.4V Drill Kit	354	195
3107DVS	NEW 5" Random Orbit Sander	165	98
3107DVSK	3107DVS with case	195	115
3725DVS	5" Random Orbit Sander	256	149
3727DVS	6" Random Orbit Sander	266	154
B3915	10" Slide Compound Saw	1050	589
B1650K	Biscuit Joiner	286	169
B7000	Corner Detail Sander	126	68
B7001	B7000 w/ variable speed	Sale	89.95
B4050	In Line Jig Saw	206	119
11230EVS	SDS-max 1-1/2" Rtry Hmr	910	519
11231EVS	SDS-max 1-3/4" Rotary Hammer	1363	785
11223EVSN	NEW SDS-max 2" Rotary Hammer	1595	915
11224VSR	7/8" SDS Rotary Drill	404	229

STABILA LEVELS

24640	24" Level w/ hand holes	62.20	43
24670	48" Level w/ hand holes	79.70	55
24680	72" Level w/ hand holes	145.45	99
27170	48" Level w/o hand holes	71	49
27000	78" Level w/o hand holes	146	102
80LMS	NEW Laser Level System	532	365

AIRY AIR NAILERS

Model	Description	List	Sale
0241SK	Brad Nailer 3/8"-1 9/16"	180	96
0250SK	Brad Nailer 3/4"-2"	296	164
0626SK	1/4" Crown Stapler 3/8"-1"	194	104
0645	1/4" Crown Stapler 3/4"-1-9/16"	310	175

Above Nailers come w/case, fasteners, oil & wrenches

0565T	Angle Finish Nailer 1"-2-1/2"	386	205

PORTA NAILER

401	Porta Nailer complete	295	209
501	Face Nailer complete	295	209

DAVID WHITE

LP6-20	Sight Level package - 20x	329	215
LP6-20XL	LP6-20 w/9056 tripod & 7620 rod	275	
LT8-300	Level Transit - 26x	739	489
LT8-300P	above Level w/ optical plum	869	565
LT6-900	Level Transit - 20x	419	269
ALT6-900	Automatic Level - Transit -18x	666	429
ALTP6-900	above Level w/tripod & rod	799	499
ALP6-18HD	above Level w/tripod & rod	599	395
LL100	Finish Line Laser Level	199	135
ML200	NEW Visible Beam Laser	979	799

RYOBI SPECIALS

RE600	3 HP Plunge Router	500	228
BE321	3"x21" v/ spd Belt Sander	310	148
BT3000	10" Table Saw w/ stand	1125	529
AP12	12" Bench Planer	884	389
OSS450	Oscillating Spindle Sander	340	159
DC500	Detail Carver	120	64
HT20VSK	NEW Multi Tool	115	59
CD125K	12V cordless Drill w/ 2 batt	175	109
CTH1442K	14.4V 3/8" Drill Kit	275	159

Msxe6362	FEIN Triangle Sander v/spd		205
Msx625	FEIN New Air Triangle Sander		195
LPN672	PONY Air Palm Nailer w/glove		94.99
RTM01	ROTOZIP Drywall cut out unit		68.95

QUAL-CRAFT PRODUCTS

2200	Pump Jack	79	58
2201	Pump Jack Brace	30	20
2203	Pump Jack guard rail holder	31	23
2204	Workbench & rail holder combo	53	39

Buy any 6 (can be assort.) deduct 10%

2601	Wall Jack	167	108

Lots of 4 deduct additional 10%

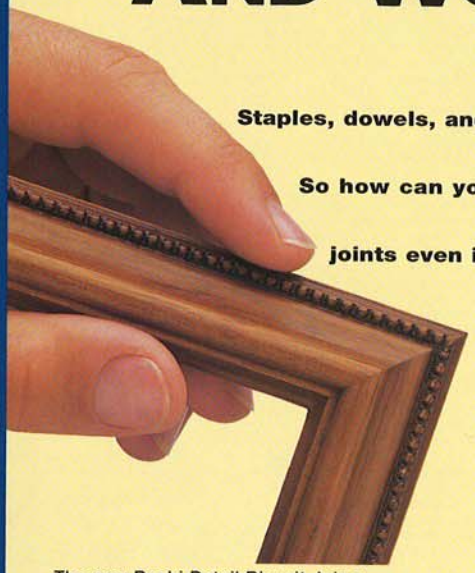
PORTER CABLE

9444	New Profile Sander Kit	220	119
7498	Ultimate Cut-out tool	119	69
97499	7499 w/ case & bits	150	89
690	1-1/2 HP Router 8 amp	278	142
90690	690 Router w/ steel case	309	159
691	1-1/2 HP Router D-handle	303	158
693	1-1/2 HP Plunge Router Base	338	184
6931	Plunge Router Base	139	79
695	1-1/2 HP Router/Shaper	418	235
696	Heavy Duty Shaper Table	238	135
351	3"x21" Belt Sander w/o bag	302	165
352VS	3x21v/s Belt Sander w/bag	321	165
360	3"x24" Belt Sander w/ bag	397	214
361	3"x24" Belt Sander w/o bag	377	204
362	4"x24" Belt Sander w/ bag	412	224
97751	1/2" v/spd Hammer Dall w/cse	274	155
9125	NEW 3-1/4" Planer Kit w/ case	250	145
9118	Porta Plane Kit 7 amp	400	229
505	1/2 sheet Pad Sander	249	129
97549	Top handle Jig Saw 4.8 amp w/ case & blades	275	144
330	Speed Block Sander 1/4 sheet	120	65
556	Biscuit joiner w/5556 fence	Sale	139
345	6" Saw Boss 9 amp	207	114
9345	345 comp. w/cse & carb blde	237	138
9647	TIGER CUB Recip. Saw	230	134
9637	Full var/spd Recip Saw 8 amp	276	148
7519	3-1/4 HP Router 2 Handle	469	255
7518	3-1/4 HP 5 speed Router	534	279
7539	3-1/4HP v/spd Plunge Router	534	279
7310	5.6 amp Laminate Trimmer	176	98
97310	Laminate Trimmer Kit comp	336	198
7335	5" Random Orbit Sander	254	135
97355	7335 w/ case & dust pick-up	274	145
7336	6" Random Orbit Sander	259	138
97366	7336 w/ case & dust pick-up	284	149
73333	Dust Collection system	29	24.50
9853K	12V 3/8" Drill Kit w/ 2 batt	305	158
8500	12V battery for above drills	Sale	45
332	Palm Grip Rndm Orb Sander	133	72
333	above sander with dust bag	148	79
334	333 Sander with PSA pad	148	79
550	Pocket Cutter with case	352	195
310	Production Lam. Trimmer	270	152
347	7-1/4" "Framers" Circ Saw	230	129
347K	347 Saw w/ plastic case	250	134
743	347 Saw - left hand version	230	129
743K	743 Saw w/ plastic case	250	134
447	347 Saw with brake	259	139
843	447 Saw-left hand version	259	139
7800	Drywall Sander	589	335
7810	Wet/Dry Vac for above sander	452	259
9737	New Tiger Recipro Saw	307	165
BN125	Brad Nailer -18 ga. 5/8"- 1-1/4"	144	95
BN200	Brad Nailer -18 ga. 3/4"-2"	238	145
FN200	Finish Nailer -16 ga. 3/8"-2"	270	165
FN250	Finish Nailer -16 ga. 1"-2-1/2"	362	225
DA250	Angle Nailer -15 ga. 1-1/4"-1-1/2"	412	249
FC350	Framing Nailer - clipped head	558	319
FR350	Framing Nailer - round head	558	319
9830	NEW 9.6V Drill Kit w/ 2 batt	284	139
9862	NEW 12V Drill Kit w/ 2 batt	382	179
9872	NEW 14.4V Drill Kit w/ 2 batt	424	205

FREE FREIGHT TO THE CONTINENTAL STATES ON EVERY ITEM • GIFT CERTIFICATES NOW AVAILABLE

THE NEW RYOBI DETAIL BISCUIT JOINER

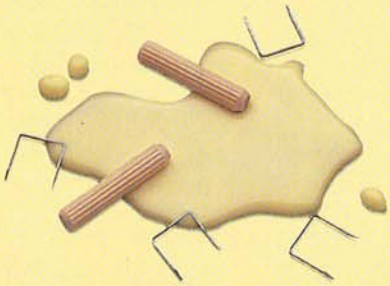
THE DIFFERENCE BETWEEN WOODWORKING AND WOODNOTWORKING.



Staples, dowels, and glue won't do. Standard-size biscuits won't fit.

So how can you make neat, tight, professional joints even in small stock? With Ryobi's new Detail Biscuit Joiner, that's how.

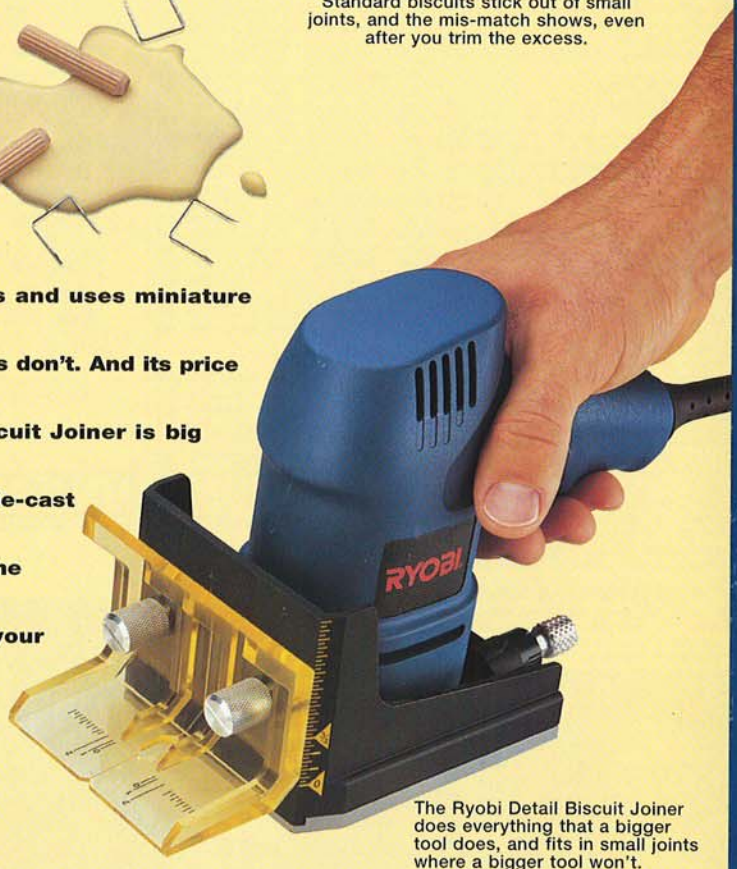
Standard biscuits stick out of small joints, and the mis-match shows, even after you trim the excess.



The new Ryobi Detail Biscuit Joiner uses miniature "Accu-biscuits" for neat, tight, professional joints.

This compact powerhouse cuts smaller slots and uses miniature "Accu-biscuits™" to fit where standard biscuits don't. And its price is as small as its biscuits. But the Detail Biscuit Joiner is big on performance, from its beefy motor to its die-cast base and see-through fence. So see the new Ryobi Detail Biscuit Joiner at your local home center. It'll get your wood working like never before.

Ryobi "Accu-biscuits" (actual size).



The Ryobi Detail Biscuit Joiner does everything that a bigger tool does, and fits in small joints where a bigger tool won't.

RYOBI

Exceed Your Expectations™

FOR MORE INFORMATION ON RYOBI'S FULL LINE OF AFFORDABLE, PRO-FEATURE WOODWORKING TOOLS, CALL 1-800-525-2579 • TWO-YEAR WARRANTY • MADE IN USA

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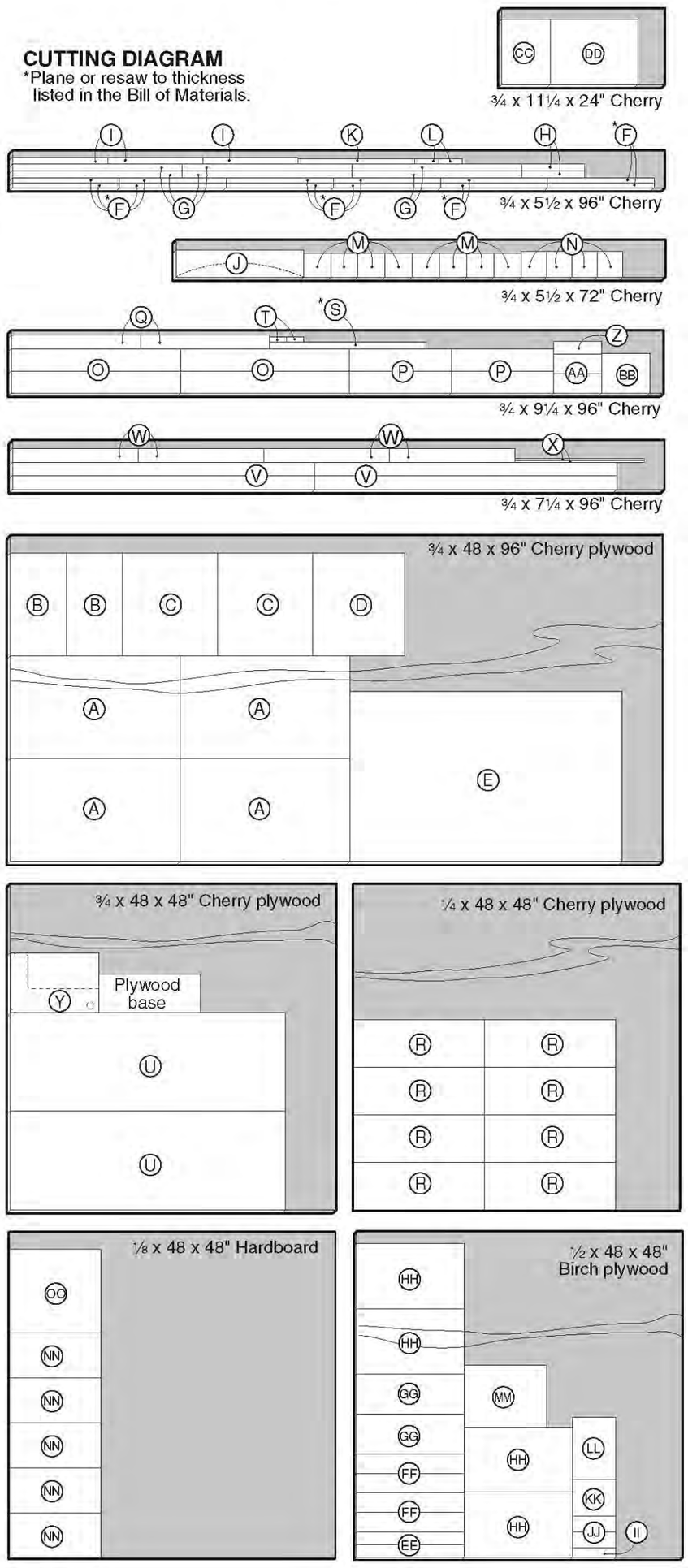
SEWING CABINET

SEE ARTICLE ON PAGE 68

CUTTING DIAGRAM

*Plane or resaw to thickness listed in the Bill of Materials.

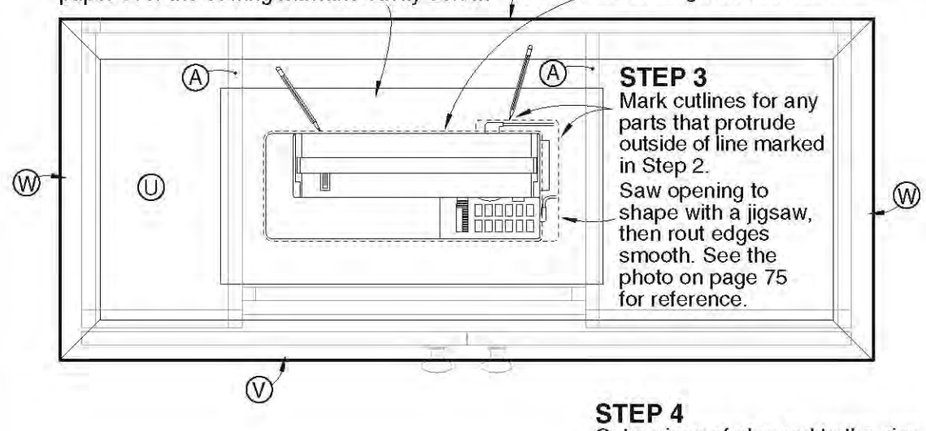

¾ x 11¼ x 24" Cherry
¾ x 5½ x 96" Cherry
¾ x 5½ x 72" Cherry
¾ x 9¼ x 96" Cherry
¾ x 7¼ x 96" Cherry
¾ x 48 x 96" Cherry plywood
¾ x 48 x 48" Cherry plywood
Plywood base
¼ x 48 x 48" Cherry plywood
⅛ x 48 x 48" Hardboard
½ x 48 x 48" Birch plywood

CREATING THE SEWING MACHINE OPENING AND INSERT

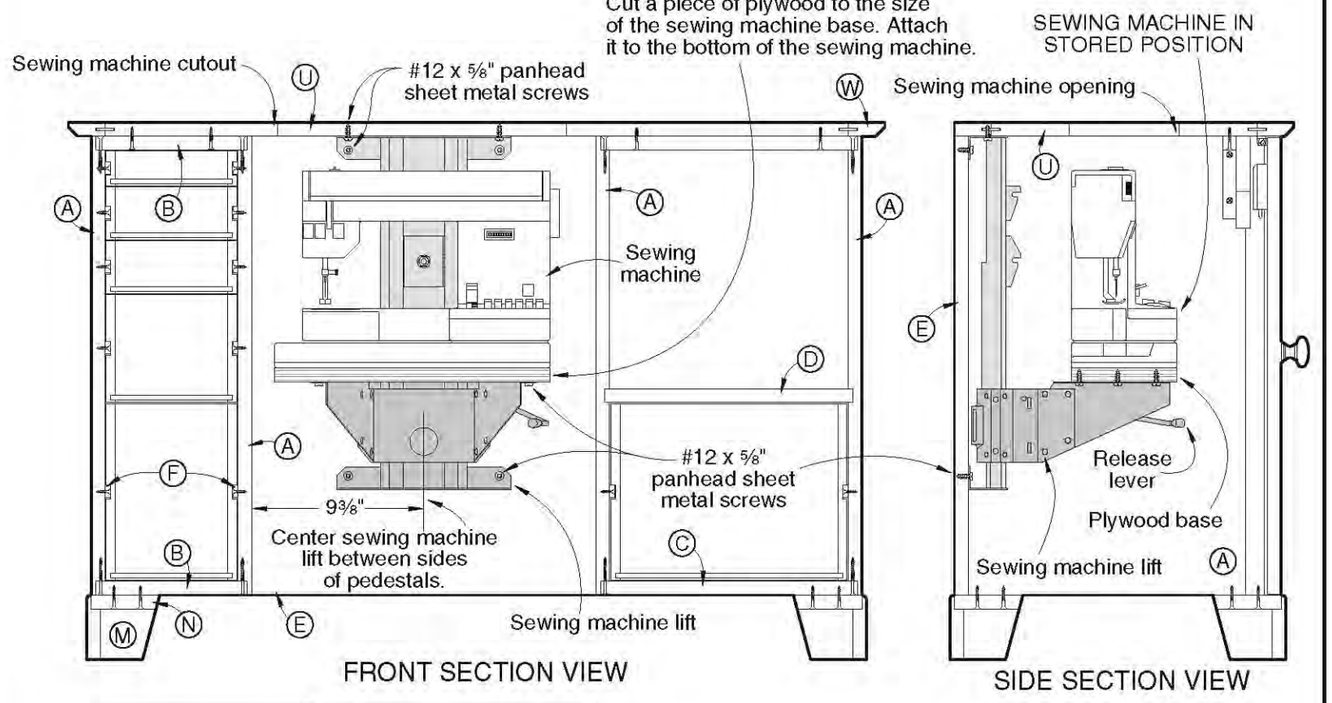
STEP 1
Using spray adhesive, adhere a piece of paper about 5" larger in length and width than the sewing machine base to the top (V), centering the paper over the sewing machine cavity below.

STEP 2
Center machine on top of paper. Mark a cutline ⅛" outside of perimeter of sewing machine base.

STEP 3
Mark cutlines for any parts that protrude outside of line marked in Step 2.
Saw opening to shape with a jigsaw, then rout edges smooth. See the photo on page 75 for reference.

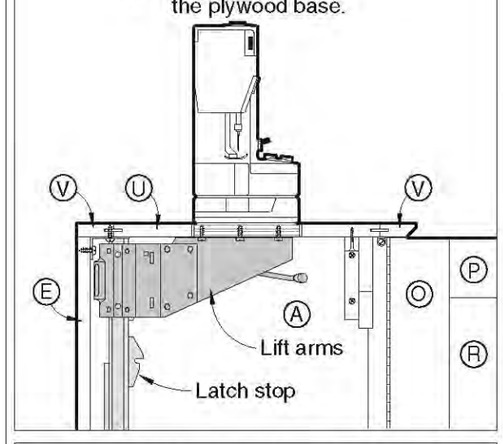


STEP 4
Cut a piece of plywood to the size of the sewing machine base. Attach it to the bottom of the sewing machine.

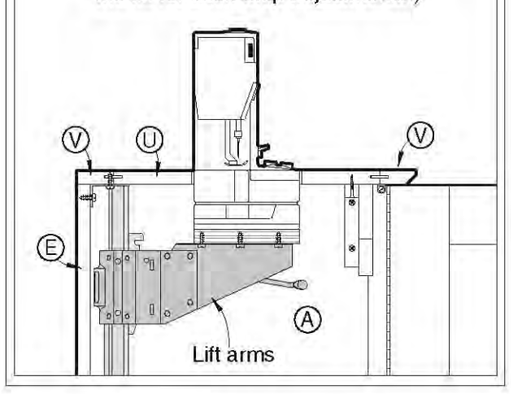


STEP 5
ADJUSTING THE LATCH STOPS

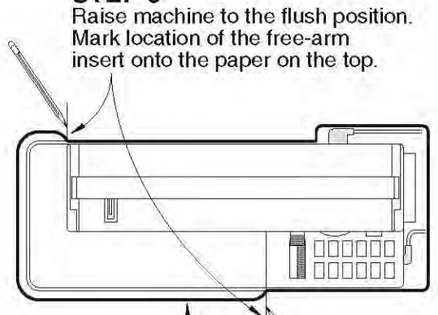
SEWING MACHINE IN FREE-ARM POSITION
Center sewing machine with attached plywood in the opening, and screw the lift arms to the plywood base.



SEWING MACHINE IN FLUSH POSITION
(See the instructions accompanying the lift for latch-stop adjustments.)

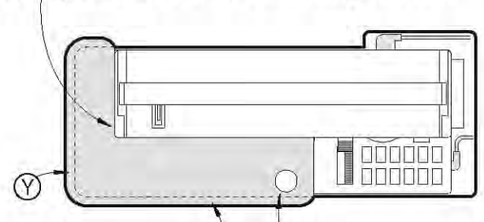


STEP 6
Raise machine to the flush position. Mark location of the free-arm insert onto the paper on the top.



STEP 7
Lower machine, cover it, and rout a ⅜" rabbet ⅜" deep between the marks. Remove paper from top (U).

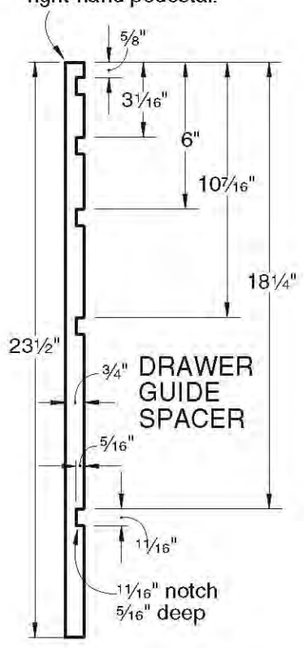
STEP 8
Raise machine to the free-arm position, and cut a piece of ¾" plywood for the insert (Y) to fit from the rabbet up to the free arm on the sewing machine.



STEP 9
Rout a ⅜" rabbet ⅜" deep along bottom edge of insert.

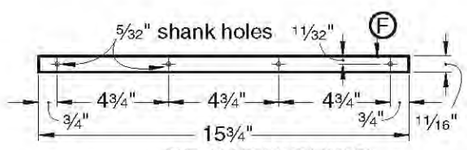
STEP 10
Drill a ⅞" finger hole in the insert.

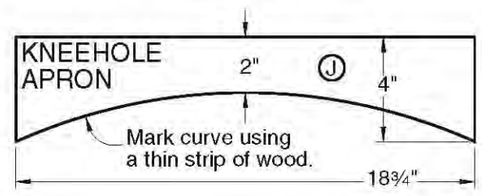
Position top end of spacer flush with bottom edge of rabbet at the top of side panel (A) when locating the drawer guides (F). See the photo on page 72 for reference. Use only the bottom notch to locate the drawer guides in the right-hand pedestal.

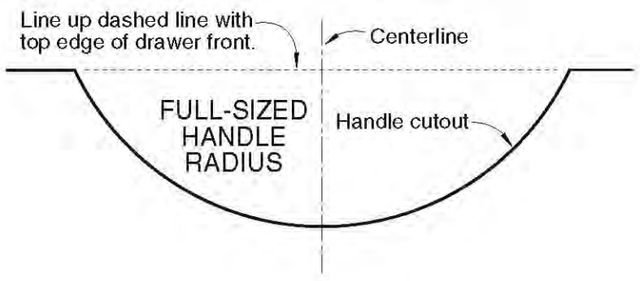


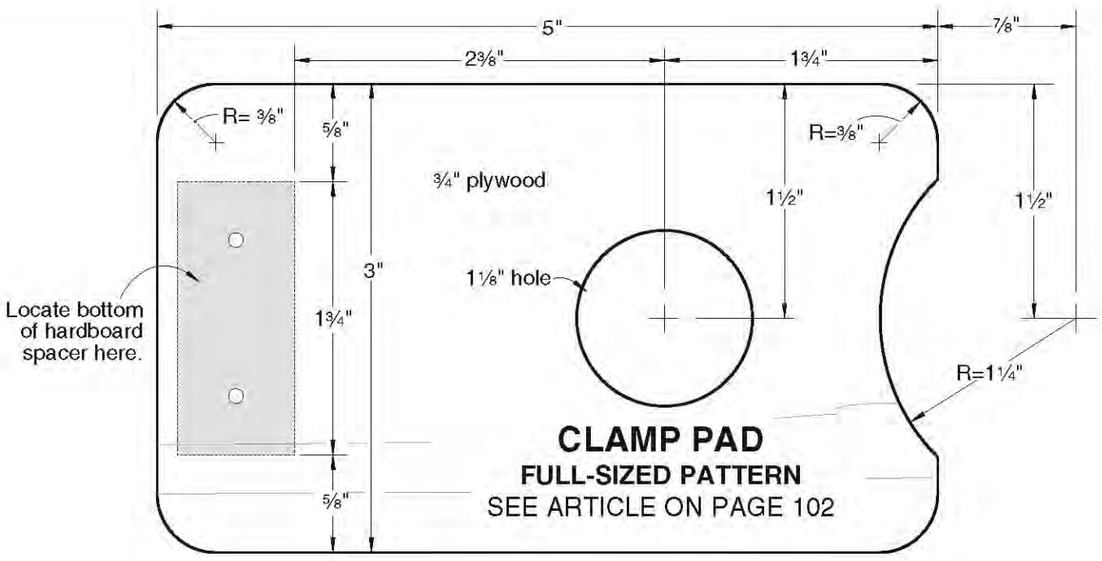
SEWING CABINET PARTS VIEW

(NOT SHOWN FULL SIZE)

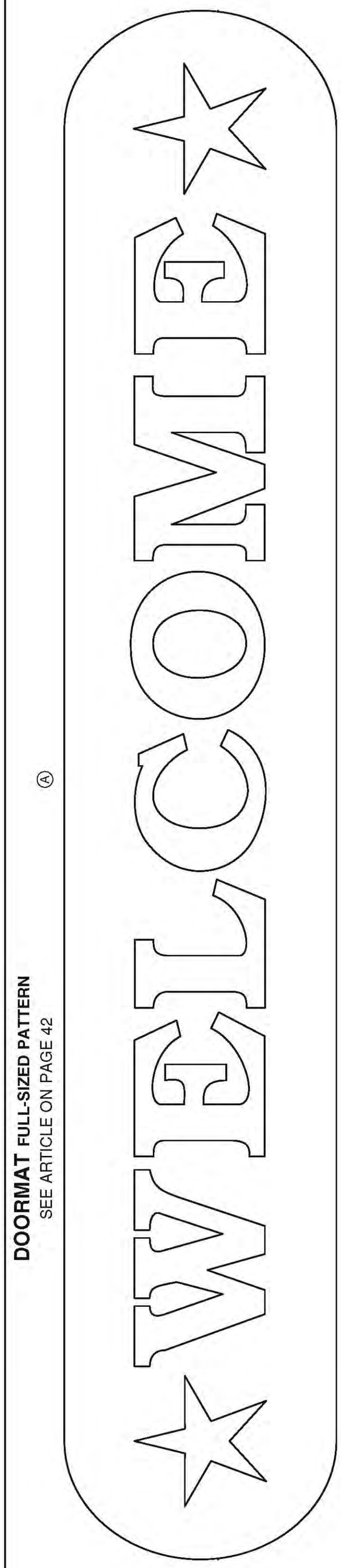








SEE ARTICLE ON PAGE 102



DOORMAT FULL-SIZED PATTERN
SEE ARTICLE ON PAGE 42

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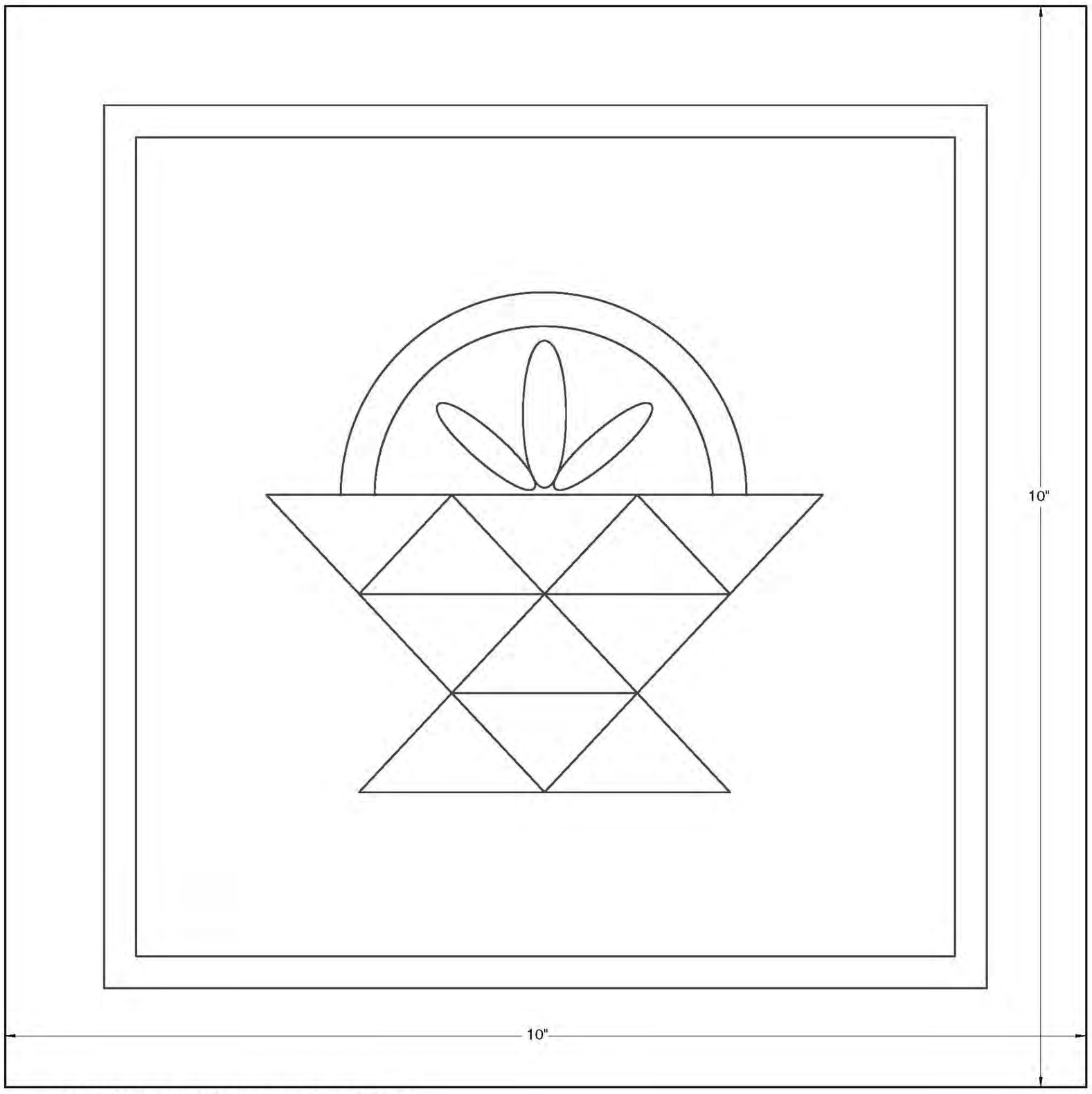
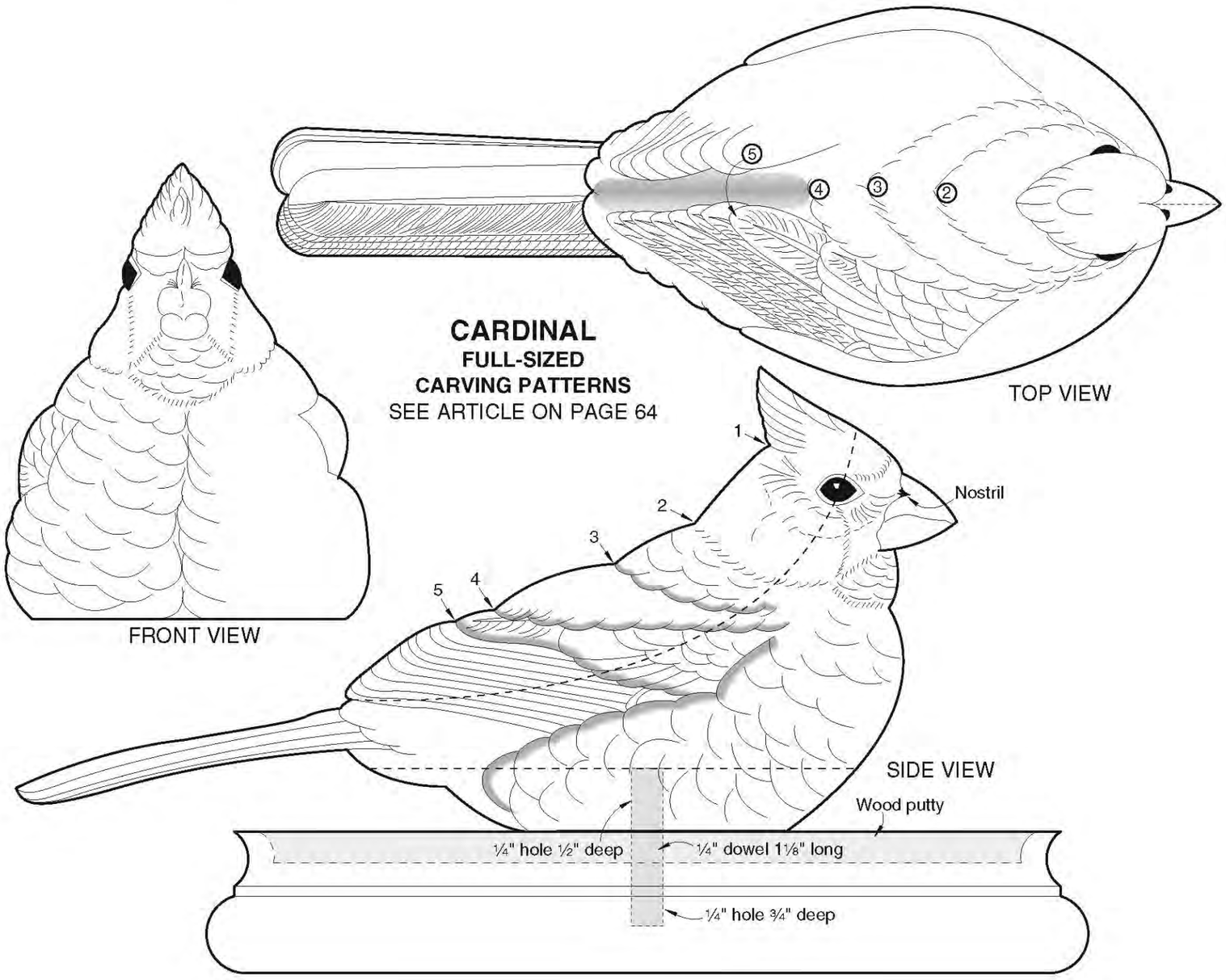


PUNCHED-TIN WALL CABINET
FULL-SIZED PATTERN
SEE ARTICLE ON PAGE 46



CARDINAL
FULL-SIZED
CARVING PATTERNS
SEE ARTICLE ON PAGE 64